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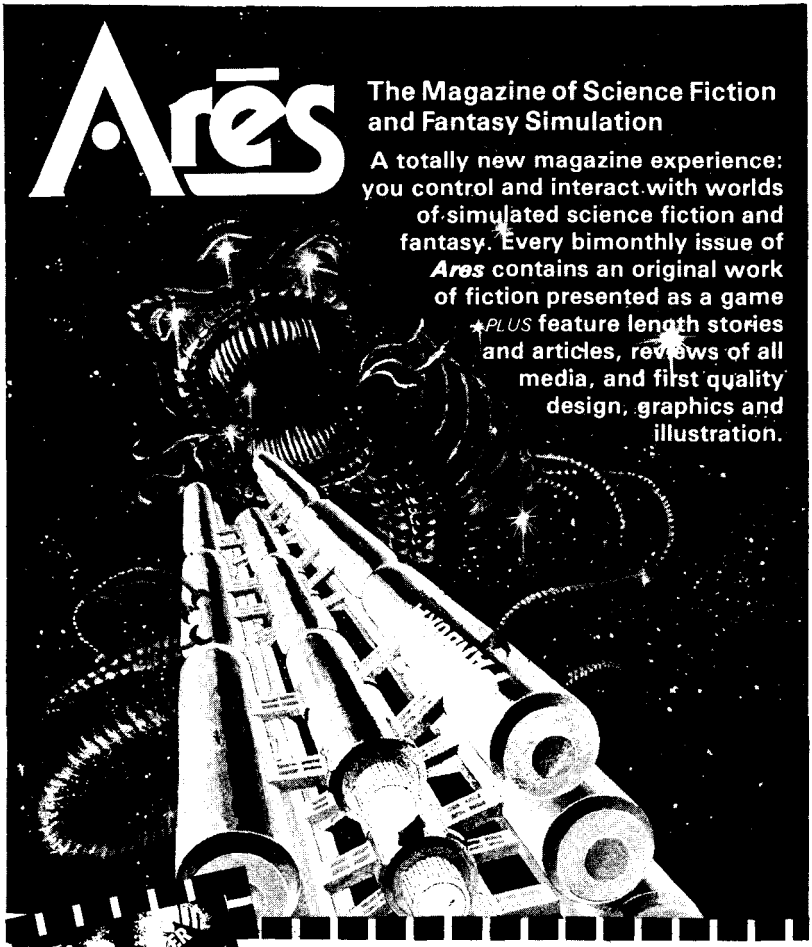

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Reasons

EDITORIAL BY STANLEY SCHMIDT

It is hardly surprising that the recent proposals for reviving a draft in this country have generated protests and debates. (Yes, I know the proposals so far are for registration only and not the draft itself. But do you really believe anyone would go to the trouble and expense of setting up the machinery with no idea of eventually using it?) What *is* perhaps surprising is that the extent and temperature of the controversy have so far been so slight. The proposals have potential implications which would profoundly and directly affect many lives. Yet many people, even of those most directly affected, seem hardly to have noticed. Some, no doubt, accept the proposals quietly because they have carefully considered the matter and decided that the suggested approach is a good one. But far more, I suspect, simply haven't thought very much or very carefully about it. Both the widespread indifference and some of the opinions which have been expressed raise interesting questions, not only about the draft and its purpose, but about *how* people think about such issues.

Those questions are my subject this month. I do not propose to give definitive answers to the questions of national defense in general or the draft in particular. I do propose to make very explicit some of the questions that need to be asked and distinctions that need to be made—and too often aren't. This issue is too important to be decided, either way, on the basis of glib assumptions and fuzzy identifications. Even if the proposed course is exactly right, it can hardly hurt to re-examine it each time it comes up, to be sure it is based on sound reasons.

Draft controversies are nothing new, but the current crop has one novel feature: the question of whether women should be included in any draft which is established. The usual reason given in support of adding women to the selective service is that fairness requires treating

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men and women equally.

But let's consider a question. Is "fair" the same as "equal"?

According to at least one dictionary definition, it is. But the same dictionary also lists "just" under "fair."

Is "fair" the same as "just"? Is "equal" the same as "just"? Many would say yes—but I suspect far fewer really believe it.

Most of us can agree (now) that it would be highly unfair to allow men but not women to vote. Most of us can agree that when that was standard practice, extending the vote to women was the obvious and proper remedy. We would be far less approving if the problem were "solved" not by giving the vote to women, but by taking it away from men.

Yet either method provides equality.

Equality is not the whole story. Persecuting all religious groups equally is not an improvement over persecuting only one. The only improvement is persecuting none.

If the draft is "wrong," imposing it on two groups is not less wrong than imposing it on one.

I am *not,* let me emphasize, expressing an opinion on the draft itself. I am only raising, for consideration by any and all, a question about the reasoning sometimes used in connection with its "equal" application. (And I will qualify this shortly.)

There is another distinction that needs to be made in this connection: the distinction between a right and a compulsion. Drafting of women is sometimes defended as a necessary part of equal rights for women. It may be a part of equal obligations that come *with* equal rights, but being drafted, *per se,* is in no way a right, an honor, or a privilege. Serving one's country may be all these things, but that's a different issue. Anyone can serve without being drafted; a draftee has little choice. The distinction is not trivial, but it is widely ignored or glossed over. A recent newspaper article quoted an interviewee as saying, in one paragraph, (a) women should be registered for the draft, and (b) if a woman prefers to stay home and raise children, that's fine.

You can't have it both ways, friends. Statement (b) implies choice; statement (a) implies no choice. "Draft" implies no choice. If equality of right to serve is the issue, that already exists, to a large degree. There are still some discrepancies, but there are more straightforward ways to eliminate them, such as allowing women to serve in combat—as volunteers.

Again, none of this is to say that the draft is necessarily wrong (or right). There are times when people do need to do unpleasant things—for many people, going to the dentist is an example—and I leave open the possibility that this is one of them. All I am saying here is that the right to serve one's country and the enforced obligation are two distinct things, and we need to be very conscious of that distinction while deciding the larger question of the draft

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controversy itself.

There is, of course, at least one important aspect of the question of whether to include women which I have so far not touched. I suggested above that an offense against two groups is in some sense worse than an offense against one. This suggestion, even if valid and even if the draft is considered an offense, is not really applicable to the draft question without the tacit assumption that including women constitutes extending conscription to an *additional* group without affecting those previously included. If you assume instead that there are a certain number of jobs to be filled and that women would merely replace men in some of them, then the advocates of drafting women for the sake of fairness have a good case.

But there remain at least two more basic questions. Is the draft itself legal, i.e., consistent with the existing framework of laws? And, is it "right," or morally acceptable? I don't propose to give The Answer to either of these, but I do want to see the questions considered. And please note that they are *separate*—though intimately related—questions.

The first question is one I have seldom heard asked. Virtually everybody seems to assume that the answer is yes—and this has puzzled and astonished me since I first studied the Constitution in school. The Thirteenth Amendment states: "Neither slavery nor involuntary servitude, except as a punishment for crime whereof the party shall have been duly convicted, shall exist within the United States or any place subject to their jurisdiction."

Period.

It does not say "except" for whatever may be found expedient. I have reread this passage many times, and checked and rechecked the meanings of the words used, and I have never been able to see how conscription is not a clear violation of this amendment. A conscript is clearly in servitude: "A condition of being bound to service." Is this state, perhaps, not "involuntary"? Easily determined: if you ask a man (or woman), "Do you want to do this?" and he (she) says, "No," it's involuntary.

So how can we reconcile conscription and the Constitution? No, I'm not a lawyer, and I'm not familiar with the details of whatever legal tests this may have withstood. But I am a reasonably literate citizen, and as I read Amendment XIII, the disparity between principle and practice is not a matter requiring subtle interpretation. It is simple, clear, and complete. The essence of the counterargument I was given by my teachers is that conscription is permitted by Article I, Section 8, of the original Constitution, which states: "The Congress shall have power . . .to raise and support armies . . . ."

But it does not say, "This power shall be exercised without regard for any general limitations imposed elsewhere in this Constitution."

Again I say, none of this purports

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to prove that the draft is wrong. But even if it is the only sane and good thing that can be done, shouldn't the apparent sharp discrepancy between what is promised and what is done be a cause for some concern? The Constitution is not God, but it is intended to serve as a very fundamental set of protections. If the protections that are needed or appropriate change with time, perhaps the promises need to be revised rather than simply disregarded while proceeding with the current expediency. If a citizen thinks he sees huge gaps between what he sees in the Constitution and what he sees done, that fact is hardly likely to bolster either his faith in the protection that document gives him, or his conviction that it is eminently worth his own efforts to defend.

The other basic question, of "rightness," is almost undoubtedly the more difficult. (I say "almost" because I know people—on both sides—who have no doubt whatsoever that they have The Right Answer.) Here we are on largely subjective ground, and getting down dangerously close to the bedrock of Premises Accepted Without Proof. (On which, I hope we all realize, *every* system of belief or thought must rest.) Young people opposing the draft are often accused of being concerned only for their own skins, and it is hardly surprising if those most vocally concerned about an issue are those most directly affected. By the same token, one could point out that it is easy for older folk to advocate something which will directly affect only others. In neither case is a discussion of the speaker's age or draft classification a valid substitute for analysis of his views. For myself, I can only offer my own, current, personal opinions—and, more importantly, questions which may provoke others into formulating better ones.

My personal view, for what it's worth, is rather simple. It is not necessarily final or complete. I agree with my colleagues who think that conscription is evil. I am far more reluctant than some to agree that it is a *necessary* evil. Yes, I am well aware of the need for defense capability. I am also aware of the oft-cited drawbacks of other systems that have been tried. But have we really exhausted the options? Or have we just not been imaginative enough? I do not believe that we have imagined all that is possible with social and political structures, any more than we have learned all there is to know about the rest of the universe. If we have been accepting conscription only because it has seemed somehow less evil than other things, it should be worth a good deal of effort to find or invent *new* things which are less evil than *any* of the old.

Perhaps, in considering what to do about conscription, we should give serious consideration to the statement, attributed to Robert Heinlein, that a society that can't get enough voluntary defenders isn't worth defending. And in connection with that, we need to be aware of the

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distinction between a society and its government. "Who is the country?" Mark Twain asked. "Is it the government? In a republic, the government is merely a servant—a temporary one. Its function is to obey orders, not originate them. Only when the republic's life is in danger should a man uphold his government when it's wrong. Otherwise, the nation has sold its honor for a phrase."

There is a superstition in some circles that the people protesting the Viet Nam fiasco and the draft used to support it were doing so not because they particularly cared about that issue but because they liked to protest, *per se,* and that was the fashionable Cause of the day. No doubt there were (and are) people of that description. But make no mistake: there were a great many others, intelligent and conscientious, who were protesting only because they thought very strongly that what was being done was terribly wrong. They honestly feared that the servant had become a master and was leading the country in directions seriously at odds with its own best interests, and that the patriotic thing to do, in the sense of defending the country, was to oppose the government.

Whether you agree or not, I hope

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you will at least recognize the possibility of that type of situation. Let's not forget that this country would not exist as such had not some of its founders had similar feelings about the government of King George III. Perhaps the greatest danger of relying on conscription, from the standpoint of the nation itself, is that it can be as easily used to support an evil government as a virtuous one, and aggression as easily as defense.

To rely on volunteer support, a government needs to show itself worthy of support—which may be a good thing in that it provides a quality control mechanism of sorts. Not a perfect mechanism, to be sure; as Hitler and others have demonstrated, it is possible to draw volunteers for reasons which are not generally admired. But a well informed, perceptive, and conscientious populace ought to be able to recognize that happening, too, and resist it. Perhaps, in the long run, there is merit in allowing societies or governments which cannot show themselves worth defending to perish, and make room for better ones.

The key words are well informed, perceptive, and conscientious. It is not enough for a society to be worth defending. To get enough voluntary defenders, it also needs citizens, in large numbers, who are aware of what it is doing and why it is worth defending, who feel personally responsible for both its actions and its safety, and who fully grasp the risks and possible consequences of their failure to take personal responsibility for its defense. All this requires a far more effective educational system than we now have. But that seems eminently desirable in any case.

At the moment, it seems to me, a great many people do not feel any close personal identification with the destiny of their country. They feel that their government is a thing apart, beyond their control and not responsive to their needs, and therefore they feel little personal responsibility toward it. And this is a very dangerous thing.

Let the debate continue, with full, but careful and thoughtful, participation by all. Let us grant, for the sake of argument, that Heinlein may be wrong and a society which must force people to defend it may still be worthy of defense. Let us grant, in the same spirit, that some circumstances may warrant a draft. But let us also consider the possibility that this need—and the need for the military "solution" itself—have been assumed too casually at times in the past. If we decide to do it again, let's be very sure that circumstances really warrant it, and that we have looked really hard at all possible alternatives, including new ones.

If, after all that, we decide to proceed with a draft, let's be honest with ourselves and also change the Constitution to agree with what we're actually doing. But if we do that, let's be very, *very* conscious of exactly what we're doing.

And why.■

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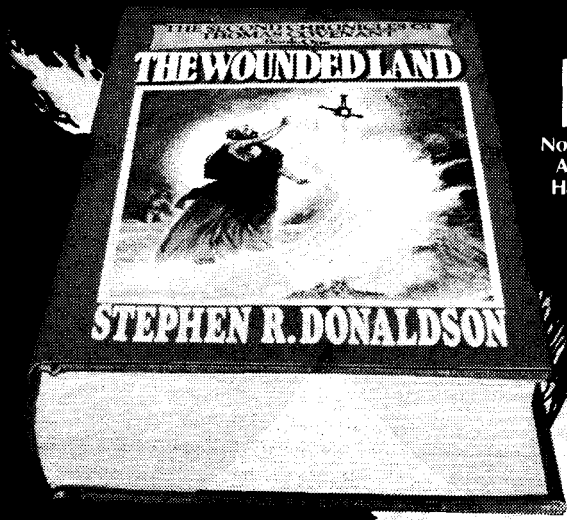

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Anasazi

The Anasazi culture vanished a long time ago—but the reasons may still be very timely.

by DEAN ING

PART ONE OF TWO PARTS

BROECK STEADMAN

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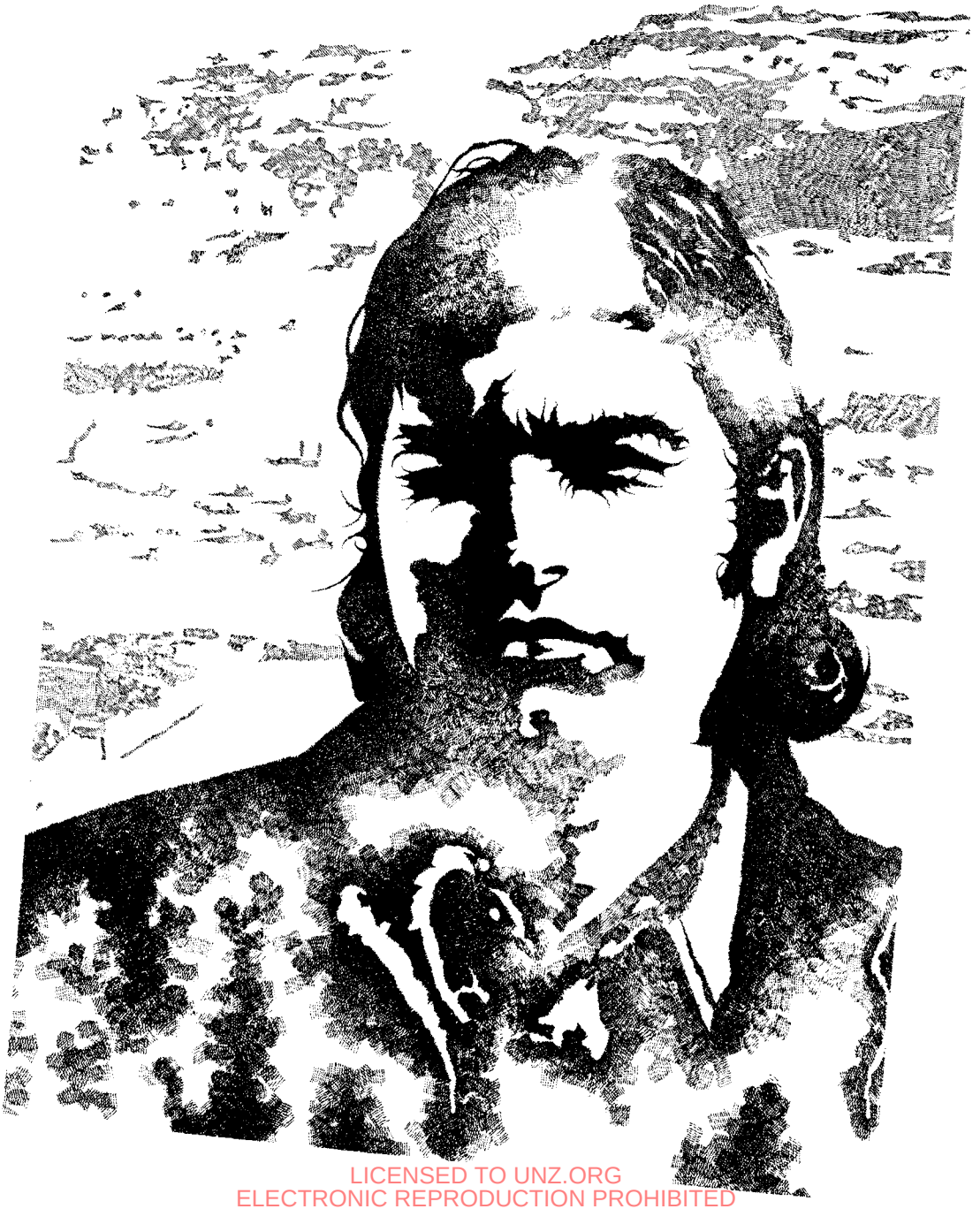

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1124 A.D.: the planet throbbed with life, a promise of intelligent host organisms for the crew of the user starship. The users eased into orbit, their sensors scanning fruitlessly for radiomagnetic communication, subspace waves, or advanced energy sources. On some land masses, cautious probing revealed vast biped armies disputing by means of quadruped cavalry. Yet on two interconnected continental masses they found bipeds without cavalry, or wheels, or iron. Though most of the primitives were nomadic, some had built permanent settlements where they grew cereals, legumes, and squash. Best of all, the bipeds were organically compatible with user protein and large enough to serve as hosts.

A user bulked scarcely larger than a human brain and could penetrate mammalian tissue with ease. There seemed nothing that might interfere with immediate colonization; certainly the users did not expect to meet disaster from a local weather anomaly.

The user tactic was to be straightforward: take control of a small sedentary group, breed more users within the hosts, expand their control to larger settlements, eventually to the other continents. Thus the landing site was near a small settlement and roughly equidistant from three larger ones. Eight hundred years later, ruins of the larger settlements would be known as Canyon De Chelly, Mesa Verde, and Chaco Canyon.

To the human inhabitants then, as now, the land owned a terrible shining beauty. Buttes of yellow, salmon, and umber were sandblasted first to soft contours, then gradually to oblivion. Cedar, piñon pine, sage, and tuft grass struggled against dry winds that ransacked the unprotected valleys. Moisture was so precious that the patient Amerinds dug through powder snow to plant corn that might, or might not, mature. Near most settlements lay scores of tiny check dams, designed to capture the occasional cloudburst or snowmelt. During early summer days when rainfall was adequate, the land exhaled a musk of cedar and wildflowers. In dry years the land lay like a burnt offering, consumed by the sun. At times even ocotillo cacti lost their scarlet blossoms, grew brittle enough to topple down knife-sharp canyon slopes.

Forged between the bright-hued anvil of high desert and the hammer of the sun, Amerinds carved an ecological niche. There was no time left to build a true leisure society. The users sought to exploit this situation.

The shuttle craft detached itself from the starship and wafted down on repulsors, a crystalline egg that tilted slightly as it settled on hard-packed earth. A pitiless sun dominated the scene, though a flock of clouds sulked on the horizon. Seven of the eight male users sortied quietly in small crystal eggs on power broadcast from their shuttle, floating above scrub and cacti in search of nearby humans to be stunned and infiltrated. The eighth male stayed with the shuttle to protect the eight smaller females.

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Though both sexes might best be described as amoeboid in shape, a user boasted nearly as many cells as a human. A female user needed several months to produce her offspring cysts, but a user's natural life span was a hundred times that of a human. They rarely hurried. All of the shuttle's life-support systems performed flawlessly including the serenity beam, which was a male user's way of deluding its cells into behaving as if a female were physically present. Gender-anxiety had once been a survival characteristic; now it was merely an organic curb, easily overstepped by an omnidirectional subspace transmitter.

The transmitter, too bulky for the tiny sortie vehicles, lay within the shuttle beaming female emanations to which males were attuned. The beam was unaffected by intruding mass, but it did attenuate with distance. The male who sortied more than a hundred kilometers from the shuttle would quickly succumb to violent anxiety, exhaustion, and death. The serenity beam transmitter was even better protected within the shuttle than were the females themselves.

The shuttle owed its tilt to the gentle slope of an alluvial deposit from an arroyo nearby. There was almost no moisture in the soil, nor had there been for years. A user, forced to crawl over that parched surface, would quickly die of dehydration unless it had time to produce a thin temporary shell of gristle. This, too, was in the user bag of inherited tricks, but normally the user voided its gristle-producing chondroprotein as excrement. The sentry user felt relief when, in late afternoon, a few raindrops spattered on the shuttle. Perhaps, he thought, this sunbaked hell would get a little moisture.

Several kilometers up the arroyo, cloud formations were dumping furious curtains of rain on ground baked too hard to absorb it. Gradual mesa slopes became sheets of water that gathered in the arroyo's upper reaches, plummeted down declivities, became a hurtling fist of water that filled the arroyo and emerged from a bend toward the shuttle carrying boulders with it. Once or twice in a human generation, parts of this high arid region suffered such miracles of midsummer violence. This one did not last long but when the last trickle died there was no shuttle, no sortie power, and no sentry or live female users. Shards of quartz glittered in the alluvium and, in a crevice ten meters below the surface, the serenity beam continued. Isotope powered, it might continue until the next glaciation.

The user starship, en route to a synchronous orbit, lay beyond the horizon and lacked visual contact when its shuttle was pulverized. Moreover, the starship commanders were already uneasy. On a coastal plain of the southern hemisphere lay effigies drawn on a scale so vast that they were clearly visible from orbit. Animal figures and geometrical shapes predominated on the Nazca Plain, starship-sized and pregnant

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with possible meaning. It seemed possible that the bipeds had etched the effigies from a sense of religious awe and intended them to be seen from orbit.

But no user ship had ever penetrated this locale and users, with the pragmatism of any intelligent parasite, avoided other spacefaring races. When the starship passed again over the landing site, the evidence seemed to imply climate-control weapons. This was enough, and more: in moments, the surviving Earthbound users were abandoned as the starship fled.

The survivors were fortunate in one respect. They had converged on a group of dwellings and beamed the inhabitants senseless before the shuttle was obliterated. They chose adult specimens as hosts. Within an hour, they found their way through the skins of their new slaves to take up residence inside.

For days the people of the tiny settlement wondered aloud at the jeweled airborne motes that had paid them such a painful visit. The inert sortie eggs were all found and smashed. Three men and four women—most of the adult population—complained of various ills as the users investigated their unwilling hosts. The users did not fully recognize their new isolation for weeks, and only gradually realized how their females must have perished.

Lacking instruments, they could pinpoint the serenity beam source no closer than roughly a kilometer and saw that the search would be fruitless without heavy equipment, carefully employed. With their females dead, the seven users would have to bide their time, develop the tools to build subspace distress beacon modules, and stay within the high desert area in the meantime. Perhaps the humans would develop tools which the users could adapt for a beacon. There was, after all, no hurry. Yet.

In time, and after expending many bodies, the users learned to cope. They learned the language—like the people themselves, a Keresan prototype—and learned to use host senses by intruding their own filaments into appropriate nerve bundles. To the unencumbered members of the tribe, the seven hosts became pitiful husks. They slurred their words, stumbled, were incontinent. But they never complained, and for an excellent reason: users ruthlessly absorbed neocortical tissue. There was no longer any locus of body control to countermand that of the user; it was tantamount to brain death.

Once in control of a host, a user typically spread sensor patches just beneath the surface of the host's body. In this way two hosts could grasp hands, the users communicating silently by minute galvanic changes. The users compared findings, agreed that their hosts were slowly dying. It was none too soon for the naive humans who took on more of the hunting and cultivation.

In their cruel forays into human physiology, the users learned that

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adult humans were simply too large for ideal hosts. One user guessed that immature specimens could more easily adapt to the needs of a user. Muscle coordination would also be easier with a smaller host.

A year passed. Users found that a small child became an anemic host and that one of twelve or fourteen must either be artificially stunted, with unpleasant side effects, or must be abandoned. One user lived for weeks in a *canis familiaris,* the short-faced dog that had migrated with mankind countless years before. The dog deprived the user of manipulative skills and was too small to last, but it became part of a successful experiment. Three users, two in adolescent bodies and one in the emaciated dog, took a naive ten-year-old into a canyon.

The dog obligingly bared its throat to a chert knife. The child lay sobbing, overpowered, his forearm laid open by the knife. The user flowed from the dog's bloody tissue directly into the boy, lowering transfer time dramatically. With growing expertise, users could now gain control of a host after the briefest struggle against a child's defenses.

Some of the more subtle problems of the users were more easily solved than were obvious ones. Human leucocytes did not attack the foreign protein since the tiny user cells could surrogate host cell walls without conscious effort. A user took sustenance from the host blood supply easily, but could not dispose of its waste in the bloodstream for long before the human kidneys failed. Eventually, users found it expedient to tap into the host's ureters, passing user excreta liquids into the human bladder to be voided in urine.

The users never perfected the system; bone tumors and tooth impaction were accepted as small difficulties. The host would never outgrow its adolescence in any case, since the user always discarded it when the child's mass neared forty kilos.

The tiny settlement could not, of course, long supply enough children. It would be necessary to obtain new bodies and, with caution, to initiate societal changes more amiable to user needs. Gradually the users surveyed their domain afoot, usurping children as necessary—increasingly male children as they came to know the sedentary role of the local females. Users found tribal societies so refractory to change that it became necessary to build their own settlement. There, new faces could appear without fear of rejection. There, advanced technical skills might be developed without fear of superstitious reprisal.

During the next century, people of the distant mesa villages, who would one day be called *Anasazi,* became aware that their children disappeared too frequently for chance occurrence. Multiroomed apartments of stone and mud were abandoned; others were built as cliff fortresses against a nameless presence. The blistering three-year drought that began in 1215

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A.D. was thought to be an omen, and Mesa Verde matriarchs came near the mark when trying to keep their children from wandering: they invented the legend of the child-stealer.

Eventually a combination of chance sightings and careful tracking led a party of warriors due south from Mesa Verde. Nearly a hundred kilometers away, they found a strange settlement where small children were enslaved for field work and deferred use—evidently by a handful of adolescents. Despite the inhuman accuracy of crossbows in the hands of the defenders, the fight was brief, its conclusion foregone. The users retreated down the roof hatch of their kivalike tower, stoked its fire with dry brush and their wooden weapons to halt pursuit.

The avenging adults retaliated by heaving green sage down the hatch, then squatted complacently as the smoke poured out. Hours later they found the short tunnel to the main house. They never found the child-stealers or the second tunnel, but they left the site a ruin.

The users pondered long over lessons from their social experiment. Food production in this hostile land required most of their time. It had taken a century to forge a few iron tools and to admit that they were having little success with deposition of gold circuitry on ceramic tiles. They were no more successful with crystal fusion and other techniques necessary to construct the modules of a subspace beacon. Perhaps the time would come when humans would develop the technology for adaptation—at which the users were experts.

Meanwhile, the users could attach themselves to a settlement large enough to stand against marauding Apache, trading freedom for security. The sinister 'children' were rejected in Chaco Canyon, but had better luck some distance to the southeast.

By an appalling irony, the next drought lasted a full generation, finally forcing the Anasazi south from their cliff cities. Some—especially the children—found a welcome in one settlement. Over two centuries later the settlement was to be named Pueblo San Saba by a user of another sort, Francisco Vasquez de Coronado. Spanish technology of 1540 A.D. was modest, but the users allowed themselves to speculate. Perhaps in time the humans would bring electronic microprocessors within the influence of the serenity beam...

1994 A.D.: He was tall, with the slender strength of a distance runner. His skin was the color of tobacco, and he laid down the camel's hair brush with the weariness, or the care, of a man older than thirty-five. He strode from his excavation to the dented yellow Datsun pickup, wiping dust from his glasses with his neckerchief, and snaked an arm inside the cab to quell the buzzer.

"Raimondo Koshare here," he said to the radiophone. His voice, a slow-measured baritone, had a

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cadence that was not entirely English nor wholly Spanish. It was both, with a touch of Four-Corners Keresan.

His black eyes brightened; he eased into the driver's seat, grinning. "Valerie Clarke? Sure I'll accept the charges, Operator." A pause, then greetings that were more laughter than words. He listened for a moment. "Of course I mean it, Val," he insisted, rummaging in his cooler for a beer. "Don't let the formal tone of my letter fool you. Figured you'd need to show it there in Boise to your director at McAdams Center."

Another pause, listening, swilling cold brew. Then: "The truth is, I need the intuition of that friend of yours as much as I need you. Yep, Laura Dunning; but I'm working alone with private foundation money, and I could never justify hiring her. Your master's in Special Ed makes you a reasonable choice to theorize about thirteenth century disadvantaged children—and naturally I thought your friend could come along."

A longer pause. Then a faint frown: "No, Val, it's legit. Remember that grad course on foundations of theory at Tempe? Yep, old Yendo used to claim you were permanently retarded at the brainstorm level; and then praised you for it. Well, now I understand what he meant. I've got a lot of data that doesn't add up. Maybe it will, for you."

He listened to the reply, nodding absently, then showed strong teeth before responding. "Sure, I still have the knack for touching. It's what makes me a good archaeologist—no, it's what lets me find things better people miss. But I can't afford to commit that to paper; the next thing to be committed would be me. Psychics had some early success in my field, but these days it's an academic fad to deride the data. All hail to the process and to hell with the product."

More listening. He squirmed unconsciously. "Look, Val, if you must know, your ol' injun guide here is suspicious. Maybe superstitious is more like it; maybe I'm just sunstruck. But I'm touching some very odd things out here. A specialist in, uh, kids with problems might help. Especially if Laura Dunning can do what you claimed. Can she really, and will you help? I need you, Val."

In his blunt honesty, Raimondo Koshare had said exactly the right thing. He brightened further at Valerie Clarke's answer, jotted notes on a clipboard as they discussed details. Gallup and Farmington had closer air terminals, but Boise to Albuquerque was a direct flight. "Besides," he added, "if you haven't shopped and eaten in Old Town Plaza, you owe it to yourself. And I'm buying."

He listened hard, trying to decipher the change in Val's voice, but failed to identify it. As a pueblеño who had never quite fitted into Amerind schools at San Saba or Kansas, or advanced work in Illinois and Arizona, Rai Koshare took

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curious stares for granted. It did not occur to him that Val Clarke's singular appearance had kept men from asking her for dinner dates. He would not have understood why she struggled to talk past the lump of gratitude in her throat. What he did understand was that, at the conclusion of spring term, Val Clarke and Laura Dunning would share his quarters for the summer.

He confirmed the date, Wednesday, June 1, then replaced the phone beneath the dashboard and finished his beer in a long, thoughtful draught. There was still time to brush away the wood ash and compacted dust before sundown, if he kept at it.

The focus of his attention was a firepit in the exact center of an ancient collapsed room which, for convenience, he called the kiva. But a kiva had six, or occasionally eight, pilaster roof supports. This one had four. It also had no ceremonial *sipapu*. As if to compensate for this lack, it did have some other things. It had a narrow tunnel, now choked with dust and animal intrusions, that led to the big house nearby. Another tunnel led from the big house. For many days, Rai had taken bore samples before realizing that the longer tunnel emerged in a gully a half kilometer distant.

More: the 'kiva' had a cache of tiles the size of a thumbnail, more like porcelain than the usual gritty product and bearing evidence that gold had once adhered to the fine patterns incised in the tiles. Ordinarily that would mean a recent intrusion marked 'PROVENIENCE UNKNOWN.' But Rai Koshare had trembled as his fingertips scanned the tiles, feeling the message of antiquity—and of warning. The maker of the tiles, he decided, was one of those children who had built this riddle—Oshara—before Columbus, even before Niccolo Polo. He was increasingly glad he had kept the ruin a secret; with every passing season, evidence mounted that he was wasting his time on an incredibly well-articulated hoax.

Yet he knew that something more sinister than a hoax lay behind Oshara, waiting to be understood. The last one who had touched those tiles had not been an innocent child.

The Oshara site bore every sign of having been built by children, then destroyed by fire without effort to save it. And its kiva firepit apparently contained small artifacts of crude steel, affixed to charred fragments that had once been hardwood. He would know more after photographs, notes, and removal of the items to a close-mouthed colleague in Santa Fe. The problem was that he already had carbon dating revealing that his site, which he had named Oshara, had been destroyed in 1260 A.D. give or take a half-century. Dendrochronology was even more specific: the few remaining roof beam ends had mostly come from trees felled in 1137 A.D., give or take zero. And that was four full centuries before the Spanish came in 1540. Pre-Columbian Amerinds did not have iron or steel. Oshara was absolutely and unquestionably pre-

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Columbian. Therefore, according to every text and research report he had ever encountered, it could not have steel.

It had steel.

Surely, surely the mechanism only looked ferrous, or it had somehow been put there by a recent visitor. All of which was goatshit, he thought; his fingertips *knew*. It was not an intrusion of that ash layer and it was, by God, steel. Not that this was the strangest of his findings. Rai Koshare sighed, adjusted his glasses for closeup work, and continued flicking the tiny brush. The first of June could not come soon enough.

He shifted his weight and toyed with his glasses in anxiety as the passengers disembarked from the Boise flight. A portly Amerind rancher hurried past wearing the equivalent of a Maserati in turquoise; a slight anglo woman with an afro haircut linked arms with a tall shapely blonde girl; a gaggle of orientals in severe suits beamed at everyone, cameras ready; and then he realized that the slender anglo woman was smiling at him.

He knew momentary shock as his vision collided with memories. He recalled Valerie's painfully thin arms and legs, her ears flaring from an abnormally small head with a puckish mouth and great bovine eyes set too far apart. These physical oddities had special terms: *microcephaly*; *hypertelorism*. They suggested mental retardation, if one managed to miss the intelligence that gleamed in those big brown eyes. Enough experts had been perfunctory so that Dina Valerie Clarke spent most of her youth in mental institutions. She had been rescued by a brilliant, self-serving intern, Chris Maffei—the same Maffei whose investigation of mental institutions had become an explosive best-seller. From Maffei, Val had learned hero worship and its risks, had finally known bitter disappointment when Maffei later ignored her for finer rags, better bones, a prettier hank of hair.

Rai saw with a rush of intuition that Val had learned subtlety since their casual friendship in Tempe, Arizona. Her ears were now subdued under a full 'natural' haircut, its spheroid of dark ringlets making her skull seem larger. Steroids and a better diet had added a few kilos to her frame so that she might now be termed slender, rather than emaciated. Her coloring was good—but it might have been Max Factor. Wedge heels made her taller, the flowered print of her blouse an added touch of cheer. Val Clarke might never be downright pretty but now, at least, passing strangers did not quickly avert their gazes or quicken their steps. The archaeologist's, "Val! You're really looking great," was only half a lie.

"Good old Rai; still blind as a bat, thank God," she laughed up at him, taking his outstretched hand. Then she turned to introduce her lissom companion.

Laura Dunning's handshake was firm, her, "I've been dying to meet

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IN MEMORIAM

Kay Tarrant was one of the most important people in the life of this magazine for most of its life. She joined it as its associate editor at Street and Smith when both she and the magazine were very young, and did not leave it until her retirement in 1973, during the editorship of Ben Bova. If her name is not as well known as it deserves to be, that is because she preferred to shun the limelight while quietly doing her job. The magnitude and importance of that job may be judged from John Campbell's often-repeated assertion that she did all the work while he just read manuscripts and had bull sessions with writers and artists.

Wallace West was perhaps our oldest contributor. Born in 1900, his stories appeared frequently in Astounding and other magazines during the 1930's, and he also had several stories and articles here during the later Campbell years. His article on steam automobiles in our May 1980 issue was probably his last publication: we are deeply sorry that he did not get to see it.

We will miss both Kay Tarrant and Wallace West.

you, Dr. Koshare," softened charmingly by her hint of a southern drawl. She was in her early twenties, a few years younger than Val.

Rai stammered something responsive, awed by the tanned platinum blonde who was almost physical perfection. Yet he saw that her dark wraparound sunglasses masked a wholly eyeless face. Val Clarke had prepared him intellectually for Laura's unique handicap, though a clinician had told him that infants born without a trace of eyes almost never survived. Even in those cases eyelids were usually present, being formed from separate embryonal structures. Laura was an exception, perhaps unique.

In short, Rai had been prepared to find that Val had exaggerated. Nothing could have prepared him for the evident paradox of a blind girl who moved as gracefully as a sighted athlete. He recalled Val's phrase, *telepathic vision*, and felt reassured by the label though he knew it explained little. If Val had been accurate in the physical details, perhaps she had not exaggerated Laura's peculiar ability, either. He realized that he was grinning and staring, then reached for Val's overnight bag. "Let's get the rest of your luggage," he said to break his own spell.

The yellow pickup was a crush-fit for the three of them as Rai turned north on University Boulevard and veered toward Albuquerque's Old Town. Val teased him about his choice of an engine-driven vehicle until Rai retorted: "If you ever had to haul a pickup out of a dry-wash with a winch, lady, you'd know why I don't want an electrabout with three hundred kilos of batteries. And," he added slyly, "I hope you aren't trying to tell me, of all people, to buy

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American." The women were still laughing when he parked near Old Town Plaza.

The visitors were charmed by the colorful mestizo ambiance of Old Town and amused at the Koshare view. "I'm gaga over the food and turquoise," Val explained to him, grinning, "and you keep muttering about rusty Civil War cannon in the plaza."

"Dug up after the Confederates buried them," he said, blinking owlishly. "What do you expect from an archaeologist?"

"Food," said Laura, "and sparkling conversation."

"Not old weapons," Val put in.

"The gazpacho and menudo I can manage," he grumped, leading them to a renovated adobe restaurant. Val's interjection had given him a new idea about his newest find at the Oshara dig. A corner of his mind chewed on it as he sketched in his life for them during dinner.

As a native of San Saba Pueblo southeast of the Chaco Canyon ruins, Rai explained, he might have taken the dry, high country for granted. "But my mother had other ideas. As a niña in the nineteen-twenties, she'd been taken away by forced government weaning. She came back from the white school about 1936, almost a woman. There were a few kids, she said, who'd run off and hide, terrified that they were going to be relocated as far away as Albuquerque. They seemed to think it was the end of the world. Funny: they all disappeared out in the desert eventually. Kids wander away from pueblos now and then, but San Saba has more than its share..."

He paused, an absent glaze in his eyes, then retrieved his narrative thread. "I came along in 1959, pretty late in mama's life, and I was something of a brat. My papa was casta—uh, part Hispano—and he didn't stay long. Most Keresan tribes are quasi-Catholic but they stick to the matrilineal ways; and the 'dobe place was Mama's, and so were most of the decisions. She wangled a job teaching traditional cooking at Haskell Indian School in Kansas about 1965 and took me along. I never saw papa after that."

"Believe me, I can relate," Val murmured, earning a nod from Laura. Both women, victims of their physical features, had grown up as wards of institutions.

Rai waved one big hand easily. "Hey, don't get me wrong! My fuel isn't pity, it's curiosity—and ego, maybe. As long as she lived, mama was enough parents for anybody." He added details of his life among the youth of tribes as disparate as Quinault and Zia during his stay at Haskell. It was inevitable that he would come to know his Amerind inheritance more broadly than most, but not as deeply as permanent San Sabans.

"Then one day at Haskell, a Wyoming Crow kid got word his papa had died. Later he got a package he didn't know what to do

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with; things his papa had meant him to have. A carved bison horn, a beaded bag that looked old as Adam, the world's scroungiest raven's wing—stuff like that.

"Something about it got to me. I snuck back to his room; he was studying to be a printer, what would he do with that junk?"

"So you stole it," Val prompted.

The high prominent cheeks flushed slightly. "I was going to," he admitted. "But just holding that bag," he began, and paused with eyes closed. He brought both hands up before him, as if fingering the steam rising from his food. He shrugged, resumed slowly: "Just holding it made me stop and concentrate. Like, forcing yourself to make chills by energizing something at the base of your skull. Do either of you understand what I mean?"

Laura did; Val was mystified. "I don't, but I've already got a thrill-chill," she said. "So tell, so tell..."

"You already know the outcome, Val. It was like being surrounded by presences I'd never met. Since then I've found that the more people handle a thing, the fainter a personal signature I get; like lots of fingerprints obscuring any given one.

"But if a thing's been handled a lot by one or two people, even long ago, —well, it's like dowsing. You feel it. I emptied the bag; it was a medicine bag, I knew that already. The Crow had said the bag hadn't been opened since his five-times-great grandfather died. Some big chief named Medicine Calf. Well, you know how it is: everybody's ancestor was five times great.

"I found some lead balls the size of a marble, a piece of gem-quality garnet, and a twist of tobacco. That's all. But when I picked up a lead ball, it was like a religious experience. I knew instantly that it was a rifle ball that had been dug out of whoever owned the bag. He hadn't been a Crow, though; didn't think like an Amerind, but he wasn't anglo either. I had a welter of feelings, good-bad, pleasure-pain, and it scared the living frijoles out of me. I fumbled the stuff back in that beaded bag and ran from it to mama's room and hid."

Rai folded a tortilla and used it to spoon his spicy stew, puebleño style. Val stopped eating and lifted an eyebrow. "If this is a shaggy dog story..." she began.

Vigorous headshake of denial as he swallowed: "Uh-uh. Trying to remember when I realized who Medicine Calf was. A year later, I guess, in a history class. Medicine Calf was the Crow name for the black mountain man they adopted: Jim Beckwourth. He died before the Custer pleasantries—about right to be a great-great-great-great-great-grandfather." He held up his free hand, fingers spread, and smiled shyly. "Five times great. And he wasn't Amerind, and not an anglo, but he was a Crow chief all right, who'd survived some shootings. That was when I started taking my knack seriously."

All through the sherbet course they argued explanations for his 'knack.' Finally Laura had heard enough.

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"You two can say it's hydration, very low frequency waves, crystal resonance, witchcraft, or any combination. I don't care; I just know it worked for people like Hurkos. If it teaches Rai how to find Clovis projectile points, it's good enough for me."

"More like the reverse," Rai said. "Look, I'm not all that brainy—I flunked enough exams to know. I got through school because I have this knack, and I can make shadowy inferences that help me map out a dig in advance. It's just a trick. I don't even understand it! Now it's found an unbelievable dig for me and I don't know what to do with it."

"You're being vague," Val complained. "What's unbelievable?"

Rai studied her face as though measuring her credulity before resuming. "Oshara is. It's a small ruin, but it seems to have been populated entirely by child geniuses for about a hundred years."

In Laura's southern idiom: "Is someone pulling your leg?"

"Everything I uncover says aitch-oh-ay-ex," Rai agreed, "but *how?* Nope, it's genuine—I think. Sometimes I feel like just backfilling the whole damn site and forgetting it."

Laura's gentle smile matched her reply. "I wonder if Ventris felt the same way about the way his work on Crete fell into place."

Rai startled: "How did you know about Michael Ventris?"

"Something we all get in linguistic anthro, Rai," Val chuckled. "People think mostly in verbal terms, you know. And Laura's talent works best when she understands the words as well as the emotional nuances."

"Um. How'd you like to fill me in on this talent on our way to my 'dobe," he asked, shoving his chair away. Laura was willing. They filed out, Rai disconcerted anew at Laura's grace in avoiding tables, walls, hurrying waiters. He would have hotly denied that he found her body fascinating even without the obstacle course.

Rai took the Coronado Freeway, U.S. 40 lancing the mesas under a dying red sun. They would skirt the Malpais lava beds before dark, he promised, but they would see little after that. With good roads, San Saba would be an hour to the north. With New Mexico roads, it was two hours and a rabbit's foot.

By nightfall they were turning north toward Crownpoint, Rai struggling to accept the evidence: Laura Dunning was to some degree telepathic. The proof he asked was easy to come by. When he asked her to describe what he was watching as he drove, she replied that he was focusing on a stone-crater in the windshield. Stunned by her accuracy, he drove in silence as they explained.

As an institutionalized child, Laura had learned to 'see' her world by interpreting the vision of others nearby. Val had found through empirical study that her borrowed vision could even function through animals, after a shadowy fashion. The greater

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the intellect of her informant, the clearer was Laura's perception of her spatial surroundings. If the informant was color-blind, so was Laura. With no one near enough to see for her, Laura was truly sightless.

The accidental friendship with Val had saved them both; Laura from an endless captivity in a mental ward, Val from violent death. Val was posing as a retardate in a private clinic that fronted for a drug ring when she found Laura honing her talent in a desperate hit-or-miss environment.

Val had urged the redoubtable Dr. Maffei to obtain Laura's release but, knowing Maffei only too well, persuaded Laura to hide her unique abilities until they were free of Maffei's influence. Val Clarke trusted no one but herself to study Laura, yet in her limited access to diagnostic equipment she had found no device that could shed light on the mechanism of Laura's ability.

"I know we're withholding some great potential," was the way Val explained it to Rai Koshare. "It galls the hell out of me; I mean, what if something should happen to the kid here," and she squeezed Laura's hand. "If I thought you were one of those selfish bastards who'd make a media freak out of her, I'd never had've told you anything."

Laura smiled to herself. "He isn't," she said.

Rai, discomfited: "Can you read me like a billboard, ma'am?"

"Not quite," Laura replied. "Mostly your emotional loadings; a few clear ideas. I wouldn't have pried—it usually gives me a headache—but that particular question worries Val a lot." She paused, responded to something Val had not verbalized: "Oh, ethics, ethics, that tired old tune," she sniffed.

"It doesn't worry me where Rai's concerned," Val said defensively.

"I know, you like him. *Bags*ful," Laura breathed dramatically.

From Val: "Stop that. How many times must I tell you?"

Rai twisted the wheel to avoid a nighthawk. "Close one," he said.

"Oh? Is it the birds that bother you?" Laura asked it in syrupy innocence. She was rewarded with a whistling slap that startled Rai speechless.

For the next ten minutes, road noise was the only thing Rai heard, or wanted to hear. If *this* was the substance of the women's relationship, he thought, he had made a terrible mistake. He suspected Laura had known that the agile nighthawk was not his sudden concern. What if she had blurted out his hapless physical response to her? Well, she had quelled it by a petty misuse of a stunning talent. *For now, at least,* he told himself.

The headlights swung past the village of White Horse. Not until she saw the cutoff with its SAN SABA sign did Val Clarke break her silence. "I apologize to both of you," she said in a small voice. "That was no way to end an argument."

Rai mumbled something acceptable. He heard Laura respond, did

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not catch the words, but knew the women had exchanged a contrite kiss in the darkness. And something about that made him still more uncomfortable. He would never understand anglo women...

He drove between adobe walls into a great dust-choked square, broad as a parade ground, his headlights yielding brief impressions of the low fortress-like pueblo of San Saba. Now his visitors forgot their clash and stood very close together as Rai struggled with their luggage. "Follow the headlights," he puffed. "The 'dobe isn't locked."

But they preferred to follow him. Rai was one of the few San Sabans who chose to have electricity and piped water and, he grumbled as the women washed in his ancient sink, he paid well for the extras. "I've got a house trailer at the Oshara dig. It has an inside toilet." This fact was announced so proudly that they knew he had none in San Saba.

He directed them to the outside privy and handed Val a flashlight without hint of embarrassment, despite the battered sheet-metal soft drink signs that formed its sides and top. He heard Val's, "A one-holer! The story of my life," but could not fathom Laura's fit of giggles.

When they returned he bade them to be at home amid the *ollas* and woolen rugs, the savory smoke and cornmeal aroma. *Mi casa es su casa,* my house is your house, was a tradition more Spanish than pueblеño and neither Val nor Laura yet appreciated the rarity of Rai's outlook. The 'dobe had been partitioned into three rooms, one partition recent and thin. The outside walls were something else again.

The windows, for example, were small and flush with the inside wall, but: "That window ledge looks like a tunnel," Val commented.

"The wall's nearly a meter thick," Rai agreed. "San Saba's big, but about average in layout. Dwellings form a square with common walls, mostly one-storey. Back when Navajo were nomads, pueblеños needed a place that'd stop an arrow and wouldn't burn, and had enough insulation to be cool in summer and warm in winter." He patted the whitewashed adobe wall. "The 'dobe is plastered over stone. Believe me, San Sabans intend to stay awhile."

The fireplace occupied a corner, with a broad work-surface at the hearth; Val guessed pueblo women had calluses on their knees. Near the ceiling was a high rectangular vent leading to the next room, and rectangular niches were neatly set into the walls for shelf space. The quiet was almost oppressive, tempered by faint wind-moans at the window ports. Val marveled at the efficiency of the place, and was fascinated by the round roof-beams three meters above the floor. "They sure look sturdy enough," she said.

"The vigas? They are," Rai said. "I ought to bore one to date them exactly; but mama made me promise not to." He went on quickly, "You have no idea how conservative

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puebleños are. My mother was a wild-eyed radical by tribal council standards. I got council permission for you two to stay because I'm more help than harm—connections with museums that buy craft items, go-between to bureaucrats, that sort of thing. But don't go strolling around here without me. Especially not this late after dark."

Laura sat up, chewing a full underlip calmly. "Why not?"

After a pause, a shrug: "It just isn't done much. You might see the Ogre Katcina." Only his sickly smile suggested he had made a joke of questionable taste. "Most San Sabans have been asleep for hours," he added.

"Then who," Laura said pleasantly, "is standing outside there?" She pointed toward the front door.

Rai was handing supple multihued woven blankets to Val at the time. He strode quickly to the door, stepped outside after a moment's tussle with the rope handle. When he returned a moment later, Val had not moved.

He sensed the unspoken questions, tried to pass it off lightly. "Always a few radicals, as I said. Just a kid. The whole town knew you were coming; I guess he just couldn't wait."

Val seemed satisfied and noted aloud that she was nearly asleep on her feet. "Coming Laura?"

Laura, sitting at the cold hearth, pulled her knees together, rubbed her upper arms briskly. Her chill was obviously internal, but her voice was steady. "It was not a child, Rai."

"Sure it was, I recognized him. If you saw him through the window—oh. Sorry." Then, faintly irritable as he considered it further, he said, "Did you, ah, see what I saw?"

"It *looked* like a tall slender boy," she agreed.

"It was; a little ladrón named Chuzo Dinay. He's a weird one, I'll give you that; but he's harmless." He turned away.

"Chuzo Dinay," Laura murmured, nodding, moving clumsily because Val's eyes were closed, settling onto the pallet next to Val's. Rai pulled a blanket across the doorway into his study where his usual pallet lay on its platform between a modern desk and rickety book shelves. It was long minutes later when Laura said again, "Chuzo Dinay. Oh yes, he's a weird one, all right."

The limber young body of Chuzo Dinay was a marvelous vehicle for the user. Still, even with contact patches spread across his fingertips, he had heard little with fingers splayed against the door. Rai Koshare's fumbling at the handle could hardly be misinterpreted, and the slight figure sped past a neighbor's beehive oven to disappear into the enveloping dark.

Chuzo ran barefoot toward the commonhouse, half-centimeter calluses protecting him from the formidable 'goat head' thorn weeds which Australian sheep had brought to the Four Corners over a century before. He and six others could disdain footgear when silence required it, ignoring the pain synapse from any thorn.

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The commonhouse, half dugout, was a low kivalike structure but with two normal doors, modified from pit houses of an earlier time. It squatted in the plaza apart from other structures, overhead lintel carvings its only identification as the quarters of unattached males in the Clown Society. San Sabans held fiercely to ancient clan relationships, indoctrinating children early into the clans. Of the three users in the prestigious Clown Society, Chuzo and one other were deemed old enough to live apart from family groups.

Chuzo felt his way into the warm blackness, past the doorway and around the central firepit to his pallet. A moment later he was seemingly inert, lying between a sleeping man and the user confederate.

The two grasped hands briefly and Chuzo felt the question: *What of the outsiders, Dinay?* Users found no difficulty in addressing one another by host names. Indeed, throughout their racial development a user who owned a host had both practical and status advantages. Shipwrecked, abandoned to their own ingenuity, users clung to the tatters of their own culture. They used host names as talismans of mutual respect—perhaps the nearest approach to affection in the user's lexicon.

Two young females, as we had heard, Chuzo soothed.

The other, ostensibly ten-year-old Ziu Tiamunyi, showed his irritation. *One day we shall kill that casta.* The half-caste label, not strictly true of Raimondo Koshare, was a common slur. *Who knows what mischief strangers will bring to the pueblo? Koshare's own bumbling is worrisome enough.*

Be glad he does most of it to the south, Tiamunyi. The users were mistaken in presuming that Rai's interest lay beyond their range to the south. Rai followed existing roads for convenience, and normally circled southward from San Saba before heading toward Oshara to the northwest. Rai had told no one of his perplexing dig, and kept his notes at the site. Had the users even vaguely suspected that their abandoned settlement was under investigation, tourists in San Saba would have seemed entirely trivial. With a naiveté he would come to regret, Chuzo Dinay radiated cheer. *They will be no trouble. They are only tourists, ignorant of our ways.*

In faint scorn: *Our ways? I truly hope so. You mean San Saba ways. Are you developing a weakness for this race?*

I am as anxious as you to complete the distress beacon, Chuzo replied. In this, enslavement of the human race was richly implied.

Did the females bring equipment we might use?

I could not discover that. We can search later, was Chuzo's answer, *but why should tourists have better devices than those we can get in Farmington?*

Ziu Tiamunyi signaled the equivalent of a shrug. San Saba was only twenty kilometers from the southeastern edge

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of the user range. Gallup was beyond the southern sweep of the serenity beam. No user had ever walked the streets of Gallup, would ever do so until the subspace beacon brought a surreptitious starship with new tools of conquest. Until then, the electronics parts shops of Gallup would be safe from user scrutiny.

Farmington, on the other hand, was only forty kilometers northeast of the spot from which the serenity beam, as always, emanated. Largely, users judged the anglos from their interactions in Farmington when one of their number essayed hitchhiking trips northward. The users remembered, far better than the oldest human, where to locate old trinkets and pots which they treated sensibly enough as treasure. Occasionally anglo collectors showed up among the fiesta tourists at San Saba, and some of these paid outlandish sums for old things. Farmington also had its share of roadside museums where a user, in his child's guise, could vend bits of treasure for lesser sums. Buried near San Saba was a hoard of pottery to delight and confuse any modern pot hunter. The revenue from this hoard had purchased vacuum tube radios in the nineteen-twenties, transistorized units since the sixties. Users learned to avoid mail-order sales after a tribal elder became curious at the anglo devices the children received. In the fifteen years since programmable pocket calculators became available to them, the users had accelerated toward success. The subspace distress beacon was now distinctly feasible, given a bit more time and materials.

Not that the beacon would be a compact device. It was necessary to emplace forty slave transmitter modules in a shallow parabolic pattern around one master module. The array required careful choice of a site which was both remote from human meddling, and shaped so that a minimum of terraforming was needed to obtain the regular concavity of a parabola nearly a kilometer across.

The requisite landscape had been found thirty kilometers north of San Saba, on an arm of the shallow canyon called Escavada Wash. Several modules would have to be slung at various heights above the wash from cables which, when the time came, would crisscross the broad canyon. Power requirements of the modules were compatible with new battery-powered ceebee units, the units suitably modified through hand-assembled subspace translators.

The chief difficulty lay in the module sequencing, since a three-dimensional parabola in normal space went through a shape transformation in subspace. And users were not gods; they learned at a moderate pace, they had forgotten details which must be patiently rediscovered, and until recently they had lacked equipment to quickly calculate the correct sequence in which the slave modules must transmit their individual signals. Without correct sequencing on a rigid timebase, the message might still be picked up. But it

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would be received as random signals both in frequency and amplitude.

The programmable calculator of 1990 provided a crucial key to the solution with its internal solid-state clock timing durations of gaming inputs. For the users, this feature meant that each transmission digit could be sent from all forty slave modules in the only correct timed sequence with precision and synchronization. The alternative would have been to send each digit in every possible sequence, which is forty factorial, which is eight-and-a-fraction times ten.

To the forty-seventh power.

The sun would be a cinder long before this latter scheme could be realized, and the users had greeted recent models of signal-generating hand calculators with something akin to glee. Now the problems were merely those of logistics: more cable, more parts, more time. And always there was the possibility that human technology might further simplify their array which, at present, called for duplicate modules for reliability. It would not be the first time they had redirected their efforts to better effect. Their camouflage in San Saba was itself a case in point.

Chuzo Dinay disengaged the hand of Ziu Tiamunyi. Their communion had taken only a few seconds and there was nothing more to be said until they knew more about the anglo women who were, Chuzo insisted, no threat. Had users not flourished for centuries among a people much more vigilant than tourists? They had even gathered components from a primitive technology which might provide the subspace beacon within a few months—while attending a pueblo school and managing to seem average children to most onlookers, including the watchful men of the Clown Society.

Chuzo settled his body for the rest it needed and let his user mind play with options. Perhaps they should fill a feed sack with treasures and borrow a car. He had known how to drive for decades, and this body was large enough now. Soon it would be oversized for a user. He had already picked its successor, a sturdy eight-year-old named Hospah Ramirez. Hospah was of the Medicine Society, but no matter: the user knew both clans well.

The host exchange was of greater import, with the usual inconveniences of a new smaller body. Perhaps the beacon could be finished before that. Perhaps the users, very soon, could be shouting their message of survival, discovery, and imminent victory across subspace. If they did not do it soon, he mused, the humans had a fair chance to become an interstellar race on their own. Using the beacon, they could stifle that possibility. Only one thing could be worse: human discovery of the users themselves while they were still few and vulnerable. That must be avoided at *any* cost....

If Albuquerque's oldest structures

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had fascinated Rai's friends, San Saba mesmerized them. Under a cloudless morning sky, heat waves already shimmered from the flat pueblo roofs as Rai squired the women into the packed-earth plaza. Corn, mutton, and dust combined in a pleasant perfume. They nodded at a boy playing with twigs in the dirt. He did not look up, but Laura quickened her steps as if he had spat.

"Careful of the goat heads," Rai cautioned as they skirted a ground-hugging plant. "They'll go through a thin sandal." He pointed out the half-buried kivas and commonhouses erected as San Saba's population grew through the centuries. Unlike more accessible pueblos, San Saba lacked the dozen or so shops where tourists might browse. A single structure served as tribal council headquarters, general store, and tourist center. A brace of dark children bought soft drinks, regarded the strangers with huge serious eyes, and then wandered outside.

Rai admitted that most of the artwork was imported. "All the way from the Navajo reservation west of here," he grinned, "and the Jicarilla to the east. Now this," he went on, indicating a basketful of potsherds, "is a grab bag." He stirred the assortment with a haughty finger, his face reflecting distaste and resigned amusement.

"If there's one thing worse than an anglo pot hunter, it's a San Saba niño. God knows where they pick up these fragments; they're a buck apiece. Save your money."

Val studied the fragments, some plain, some with arcane marks. "Couldn't you tell their source without looking?"

He met her gaze, saw the friendly challenge, then looked away from the basket as he chose a curved piece, smiling. "Recent," he murmured, putting it aside. Then, "Recent; recent; Mancos corrugated, but anybody could feel that; ah—probably Cortez black-on-white," he said, holding up a cream-colored piece with an angular repetitive black motif. Then he stopped, frowned, looked quickly at the last piece he had chosen. The set of his mouth said it: no more games.

"Oshara," he muttered in disbelief, stroking it between thumb and forefinger. "No, quite recent. *And* it's Oshara," he added, his frown deepening. "Doesn't make sense." Val and Laura waited, mute with respect for his concentration.

After a moment, Rai fished an Anthony dollar from his pocket and laid it on the counter. The San Saba girl took it without ever glancing up from her comics sheet. He tucked the potsherd into his shirt pocket and spoke to the others as they moved outside. "I swear I'll backfill the whole thing yet," he grunted, squinting at the reflected brightness of the plaza, donning dark glasses as an example to Val. Laura, in public, was never without her own. To change the subject he said, "There's always the church and graveyard."

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But Laura shook her head. "Could we drive out to this Oshara?"

Val: "Why not after lunch? Rai can fix that paper bread."

"I'd—I'm just uncomfortable," Laura confessed. "Rai, would you look at the boy who was playing next to that kiva we passed?"

Again Rai was struck by Laura's use of another's vision. He scanned the plaza. "Oh, the Clown Society commonhouse, you mean," he corrected. "The kiva's behind it."

"He isn't the same boy you surprised last night," she hazarded.

"Nope; one of the Tiamunyis. But you've got the right clan."

"Let's walk near him again, but not too near," she said. Val traded friendly shrugs with Rai. Proximity, she knew, often helped Laura to sense the mental state of children in their work at Boise.

They strolled back, apparently ignored by the boy. But Laura's shudder was obvious to Val, who rubbed her friend's forearm. "Goosebumps? In this heat?"

No answer for a long moment. They were inside Rai's abode when Laura put palms to her temples and leaned against the tall puebleño. Then, squaring her shoulders and taking a deep breath: "I'm all right now. Val, last night I got the strangest flash from that boy outside. Do you remember that old mountain man in the isolation cell in Boise? The one they said had killed and eaten those hikers up in the Sawtooth Range? I told you he thought of people as though they were flies."

"And he was a spider, you said. Don't remind me," Val answered.

"A crafty old one," Laura persisted. "There was something of him in that boy, and something else that reminded me of a true vegetative coma. As though he were carrying a catatonic on his back," she said in exact inversion of the truth.

Rai laid a gentle hand on her shoulder. "The Dinay boy sure isn't catatonic," he said. "But if you study the local kids here, you might get insights into some who've been dead for seven hundred years."

"Maybe pueblo children are just, um—" Val paused to choose a diplomatic phrase, "more stoic than those we're used to. They must surely have a different psychic complexion, Laura."

Laura: "The kids in the store weren't like that. Or were they? I usually wouldn't pay that much attention; why court a migraine? But the one we passed outside: I'd swear he was the Dinay boy if I didn't know better."

"I suppose being raised as a social enforcer could have something to do with it," Rai suggested. "I don't know the secret rituals of the Clown Society, but the Dinay kid and Ziu Tiamunyi are both members. They start early."

"Start what?"

"I'm not sure, I'm more or less in the Scalp Society. San Saba clowns aren't like anglo clowns. They keep folks in line with tricks, or unpleasant practical jokes if necessary,

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or—well, all the way to broken bones. Think of 'em as police, or as Four-Corners mafiosi, but only when they're in costume. They take it extremely seriously."

A deep exhalation. Then, "I suppose that must be it," Laura said. Clearly she supposed nothing of the sort, yet Laura knew the avoidance garnered by people who worried overmuch at trifles. She offered a tentative smile in Rai's direction: "I wonder if I'll be any earthly use with children who lived centuries ago, but I'm ready for Oshara if Val is."

Val patted her trim abdomen. "As long as this is empty, I'm not budging. All I've had is coffee."

"Can't have anglos on the warpath over coffee," Rai said, deadpan. "The stuff did more to promote peaceful trade than anything else, in these parts." He fixed Val with a comic scowl: "Long as you're going to be that perverse, you can help me."

The good-natured raillery was forced for a few minutes, an unspoken stratagem to set Laura at ease. They soon had a mesquite fire crackling under a heavy metal plate in the fireplace, while Rai mixed blue-gray cornmeal paste with a dollop of wood-ash lye. While the steel plate heated, Rai poked among his stored goods.

Under Rai's guidance the women poured zucchini, corn, beans, and a potent mixture of tomatoes and green chiles into an iron pot. Rai added red chile powder and a double-fistful of leftover turkey, explaining that the meat was from local fowl. "Before you whites came, we used a lot of dogmeat," he told them.

Laura, quickly: "I'd rather have turkey than the authentic stuff, thanks."

"Turkey's authentic; where'd you think they were first domesticated, lady?" Then he slid the pot to the rear of the steel plate, bidding Val stir it now and then, and set about making the famed piki bread.

Cornmeal paste, spread thinly over the heated plate, curled quickly at its edges and began to approximate heavy vellum. With a deft sidewise sweep of his wooden spatula, Rai loosened the pungent piki, laid it on a broad—and probably priceless, Val judged—platter of red-on-black. Then he repeated the process. They were ravished by the aroma.

In ten minutes the pot simmered, the pile of piki ready. Laura set the table with modern utensils and soon they were engulfing a San Saba meal, complete with fresh goat's milk butter. Val, following Rai's example, used a scrap of piki as a scoop. Laura slurred through a mouthful: "Gracious, what *do* you call this stew?"

Rai shrugged. "Stew. Call it sopa Anasazi if you like; it's close to the staple diet of the Anasazi."

"Remind me not to feel sorry for them," Laura replied. "But who are the Anasazi?"

"Navajo word; it just means 'the old ones,'" Rai said, amused at the

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unladylike attack on his victuals. He went on to say that Keresan pueblos had assimilated cultural bits from their neighbors, but primarily they were descended from the ancient people who had built the cities at Chaco Canyon and Mesa Verde: children of the Anasazi. Archaeologists had amassed evidence of an unbroken tradition of occupancy in the Four Corners region that stretched from before 5,000 B.C. to present times. This cultural continuity included the Anasazi and had been dubbed the Oshara tradition, said Rai, who added laconically, "But I really blew it when I named my dig. It's anything *but* traditional. More mysteries than the Balcony House."

Again they pleaded ignorance. The Balcony House, he explained, had been built around 1200 A.D. beneath a sheltering clifftop in Mesa Verde. Its people had moved there from homes on the nearby mesa, becoming cliff dwellers by definition. They had shrewdly constructed the approaches so that no one could enter or leave without a dizzying climb, and passage through a masonry slot that rendered one helpless during that passage. Other ingenious tactics made Balcony House a masterwork in defensive strategy.

"It was a case of sudden, deliberate isolation," Rai opined. "Why? There's no evidence of warfare that would've driven them there. But for some reason a bunch of settlements relocated on cliffs about the same time. Balcony House is a statement in masonry: they were hiding from something."

Val: "You mean some*one*?"

"I think so, yes. Some people insist that since there isn't any proof of organized warfare, we mustn't draw any such conclusions."

Val waggled a forefinger. "Professional caution," teasingly.

"Something I seem to lack," he said wryly. "There's no argument about the tree-ring dating, though. A ferocious drought from 1276 until nearly 1300 forced the Anasazi out of their cliff cities, and they seem to have relocated as Keresans. I thought my dig would add a piece of the mosaic. Datings show that Oshara was built before Balcony House and was occupied until shortly before the drought. Some Oshara pottery looks like degenerations of Mesa Verde stuff. Maybe because it was made by novices; children."

Val's eyes sparkled with surmise. "You think the Anasazi kids left first?"

"Some may have. I found a braided yucca rabbit snare with Mesa Verde knots. Lots of stuff; you'll see. What I *don't* find are the traditional construction or decoration motifs. Or ceremonial burials. I seem to've found an orphan's home run by the kids, and they didn't bother with traditional ways. Didn't rebuild after it burned, either. Why did they burn it? Or did they?"

Laura wiped her mouth, smacked in childlike pleasure as she sat back from an empty bowl. "If you didn't

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find any burials, how do you know it was—"

"No ceremonial ones, I said. There are burials, kids dumped into trash heaps just any old way for the next gully-washer to take. No adults. There was one under a ledge in a dry-wash that was missing a forearm and the bone hadn't begun to heal. Couldn't date it but it figures to be Osharan. A boy, judging by the skull, twelve or thirteen.

"Then there's the fingerprints on the pottery. Some of it shows prints of niños only six or eight. Nothing with adult prints, dammit. But I haven't finished the dig yet. It could take another ten years; longer, if I don't get help."

Val finally cleaned her bowl. "So get help," she said. "There must be some bright students who'd love to puzzle it all out under your all-seeing wisdom." She clasped her hands together, beamed, batted her eyes in parody of a smitten sophomore. Valerie Clarke was no schoolgirl, but her satire was compromised by longing. Rai saw it, was flattered, and let it pass. In Laura's presence, Rai Koshare found it hard to consider other women—as women.

The buzzer in Rai's pickup saved him from an uncomfortable moment. "The phone," he said redundantly, and strode outside.

After a moment Laura began to clear the table. Then, barely audible: "I thought you were through mooning over that big Indian."

"Careful with those bowls," Val said in deliberate non sequitur; "they're museum pieces."

"So is he." Laura made more clatter than necessary.

A sigh, an old dialogue revisited: "I told you a long time ago, Laura: I prefer men, they just don't return the favor. If you can't accept me as I am, stay out of my head. And never, never take advantage of me like you did last night in the pickup."

"It's Rai Koshare who's taking advantage of you. We're going to waste all summer here for room and board."

"Waste? I hope not," Val argued. "Rai's a rare bird. I do like him, that's a fact. I think you two would get along, too, if you'd give him a chance."

"Is *that* a fact?" The lovely mouth pursed in something that could have been concealed knowledge.

"That's opinion." Val moved to the sink, helped Laura with the dishes, their hips companionably touching. It was unselfishness that bade her to say, "One day you'll meet a man and go dipshit over him, and then you'll understand."

"And what will you do when this hypothetical occurrence happens?"

"Applaud. I hope," this last with a flicker of smile.

"No jealousy?"

Val considered. "Maybe. But the more I love you, the more I should applaud. If one of us were male, you and I would have what they call a marriage of convenience. It's more than that, of course," she added

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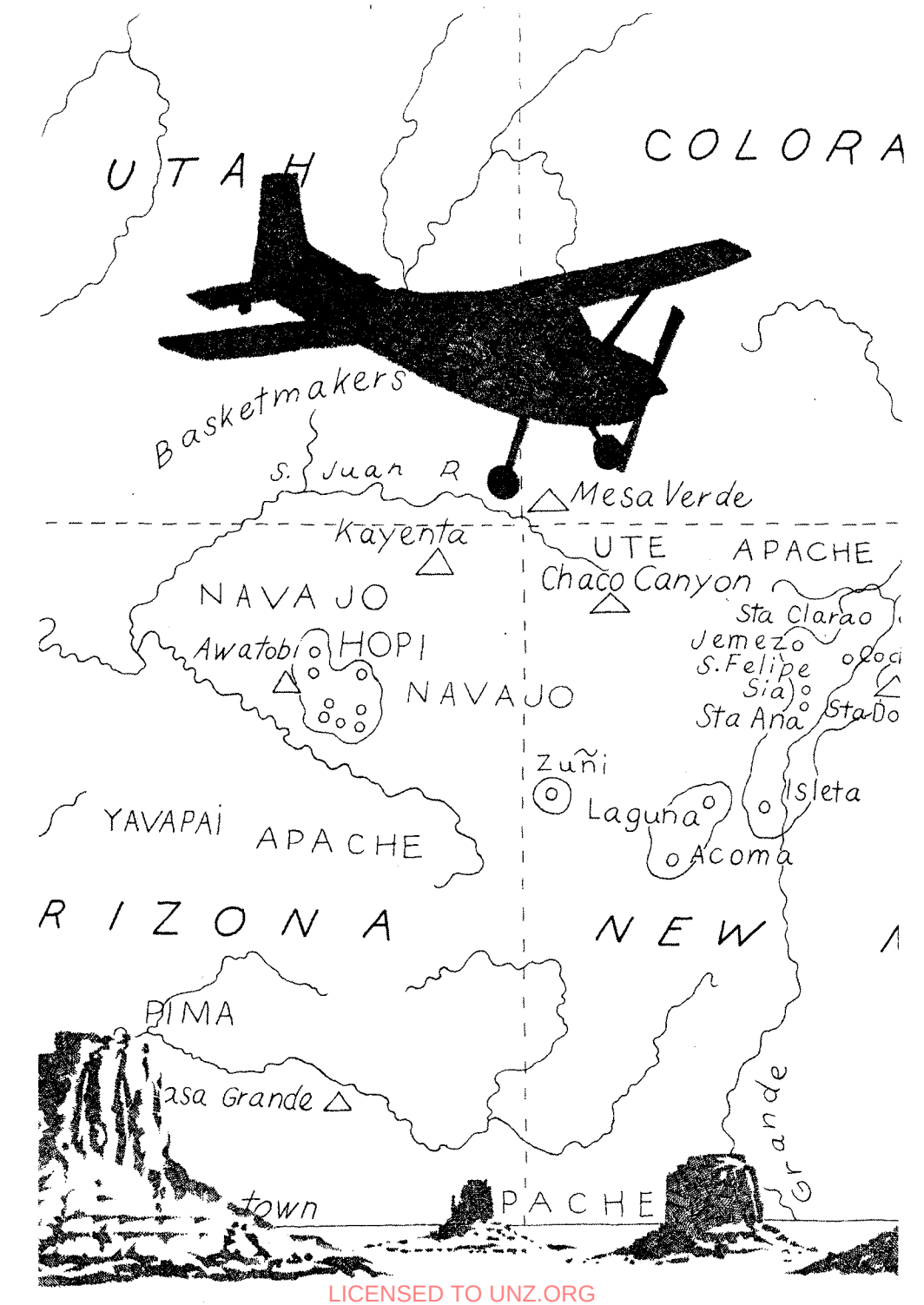

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quickly, turning as Rai walked in. She missed the subtle relief that, during the past half-minute, had begun to smooth Laura's brow.

"Snails," Rai said by way of preamble. "Anybody know what a *planorbis* snail looks like?"

Two headshakes. Val: "Fossil snails?"

"Nope; they've been found in Blue Water Creek. Some distance south, but they're hosts to a very nasty parasite. That was a friend of mine on the phone; Jeff Simes, a State Public Health guy in Gallup."

Val let her arms droop, miming helplessness. "Don't tell me: you want us to swim out and—"

"Hold on," he flashed a grin. "Several cases of schistosomiasis have turned up on another reservation. Hope I pronounced it right. It's a twelve-cylinder word for blood flukes. All Jeff wants me to do is convince San Saba elders to let SPH people take blood and stool and urine specimens here." He shook his head in cynical amusement.

Both Val and Laura had too much clinical experience to be repulsed by body functions. "It's not all that bad," Val objected.

A snort: "Try telling that to the tribal council. Jeff knows he'd have to knock this whole pueblo unconscious before they'd surrender parts of themselves to an anglo. Religious dogma; you can't even take snapshots here. I told you we were conservative."

"You can always sneak a stool sample," Laura mused, then donated a gorgeous smile. "You wouldn't believe the clinic slang for that little operation."

"As if I didn't have enough to do. Well, he's sending me some specimen containers, just in case I find some *mierda* on my boot heel," Rai grumped.

"He's got his nerve," Val said.

"Ahh, Jeff's just doing his best. So am I. But don't either of you try wheedling anything like that from anybody here." Grim lines framed his mouth: "I'm not exaggerating about the Clown Society. I'd probably get wind of it first, but they've been known to whip people out of the area on foot. On the reservation they have the legal right. Just let me do the collecting," he finished.

It was obvious that Rai would go to any lengths for his people, even at the risk of banishment or beating. Laura and Val shared the thought: they would never understand Amerinds...

There were two routes to Oshara, each with roads partway, each with its drawbacks. Rai kept delicate equipment locked in a case in the Datsun, so he avoided the direct northern route with its washboard surface and steep arroyos. Usually he swung far to the southwest in an arc, but this time he chose to cut through Chaco Canyon. They spent a few minutes absorbing the fact of Pueblo Bonito Ruin there, an Anasazi settlement and with eight hundred rooms,

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literally the largest apartment structure ever on the continent until near the turn of the twentieth century. Portions of the vast four-story sandstone ruin had been rebuilt and Rai made a point of the fact that, in the thirteenth century, the builders had carefully filled in external windows.

"It's easy to assume the Bonitians plugged their windows against the Apache but when a big attack came, the place was overrun anyway. Was Balcony House just luckier? Or were both places holed up against something else entirely?"

Val folded her arms, turning with some asperity. "What's this some *thing* business," she demanded. "That's twice you've avoided laying the blame on *people*."

"Hadn't thought about it," Rai admitted. After a moment of reflection he said, "I could claim I'm being cautious, but I guess it's mama's old stories. She believed in antibiotics, and in God, and in the Rain Katcina too. And if she believed in good, she had to believe in evil. When she told me to behave and mentioned the Ogre Katcina, I behaved."

Laura, not entirely solemn: "You believed in it?"

"She did; so I did. Most San Sabans still do. The ogre's not a person. More like a ghoul, a huge evil presence that hides and waits for children."

Val nodded. "I doubt if there's ever been a culture where mothers didn't invent bogeymen to scare naughty kids."

"Not necessarily naughty ones in San Saba. It could happen to any kid. You have to understand that just mentioning the ogre was the punishment. When the very *word* is punishment, it gains a lot of potency in a boy's mind."

"Just boys, not girls?"

"Right; maybe because girls are stay-at-homes. It's a very old tradition, and I suppose it's strengthened by the coincidence of San Saba losing more boys than most. Ever wonder why the place doesn't overpopulate? It's a big, hostile land out here. It swallowed up a lot of kids when they got old enough to go exploring. It still does," he murmured, staring across the ancient ruin.

Now Laura was affected. "Will you stop, Rai? I'm already half afraid the place is possessed. It can't be, I know; but—"

"But you don't know it after midnight, huh?" Val prodded her own breastbone with a thumb. "Me too. Let's go on to your dig, Rai."

The thirty-five kilometers from Pueblo Bonito to Oshara took an hour in the enervating heat. There was no road across the parched, nearly level valley. Rai followed the wind-blown spoor his own tires had made previously. Val, imagining she would spot the place from afar, was surprised as the vintage mobile home seemed to protrude suddenly from a depression. She said so.

"A small elevation change hides a lot," Rai responded. "You don't want to be in a dry-wash when there's

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any sign of rain, and you mustn't take long hikes without water and compass and beeper. Even then you could walk right around Oshara and never see it. Forewarned is forearmed, okay?"

They hauled overnight bags inside, momentarily ignoring the sandstone ruin that brooded a hundred meters distant, forlorn and time-ravaged in the same slight depression.

Inside the mobile home was apparent chaos. Foam packing boxes, specimen drawers, antique file cabinets, tools occupied every cranny of the living room except for a path leading to the two tiny bedrooms. These, too, were annexed for products of the Oshara dig. Rai had obviously made Herculean efforts to clear enough space for his guests.

"Well," Val chortled as she eyed a stack of boxes next to their bed, "it's snug."

The kitchenette represented lip service to amenity. The refrigerator was half-full of beer and the utensils were clean. Under the sink was a cache of canned food and juice, and a plastic canister on the countertop was half-full of jerky.

Rai opened a beer, took a lath of the jerked meat, gestured to the others. "I live on this stuff mostly," he said. "Help yourself; I'll give you a tour of Oshara."

With some hesitation, both women tried the jerky as they trailed outdoors. Laura grunted, twisted and tore at her thin slat of meat for all the world like a puppy with a slipper. "Lordy, it's a wonder you don't starve," she said finally.

"Now you know why he looks like a piece of jerky," Val joked. Privately, she admitted, it tasted damned good; salty and wild.

"Just keep chewing," he advised. "A little piece of venison jerky will swell 'til it fills your mouth. With five kilos of this stuff, an Anasazi family could walk from here to Las Cruces. Maybe they did," he ended, guiding them around weatherproof boxes, holding Laura's hand. Val supposed he had not fully realized that Laura did not need the guidance.

Val knew a vague disappointment after the vast pile of Pueblo Bonito. Yet she saw that this small site must have demanded back-breaking labor of its single investigator. An electric barrow, plugged into an extension cord and replenished from solar panels atop the mobile home, squatted on fat tires in the near distance. The barrow had worn perceptible ruts in the hard ground, ferrying tons of earth from the site to a nearby dry-wash. An old tent of buff canvas blended with the bleak landscape, drummed softly under whiffs of hot dry breeze. Beyond the tent lay Oshara.

A yellow cord stretched from a rock outcrop nearby, ending at a metal stake near a crumbled wall. The stake boasted a hand-lettered sign: 31 SJ1989-13. The wall had no true windows, only ventilation slits high on the external face. It had been a single one-story square structure some fifteen meters on a side, with a

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smaller round house a few meters away to the northwest. Three of the house's four corners were intact, over three meters high; but only the southwest wall had survived centuries of coercion by wind, rain, time.

Val counted the eight wooden roof beam ends, vigas, that protruded from near the top of the wall. They had been as thick as one of Laura's thighs. Even in death Oshara exuded an aura of strength and purpose. Unknown, unlamented by man, it might have dwindled entirely to dust but for Rai Koshare. Compared to Pueblo Bonito's text of stone, Oshara was a small question mark in the lexicon of archaeology.

Val: "What does the sign mean?"

"Site designation," said Rai. "It's on file with the state. Under the new scheme New Mexico is alphabetically number thirty-one. Ess-jay is San Juan County; Oshara's the thirteenth site claimed in the county in 1989."

Laura broke her silence. "How did you find it, Rai?"

He waved them westward along the barrow track. Fifty meters distant, a shallow dry-wash snaked southwestward from a modest peak that was visible some fifteen kilometers away. "I was hiking from a trading post to Chaco Canyon in the spring of eighty-nine and started following this wash."

"Why, that was before you came to Arizona State," Val said.

"Sure; partly it's why I went there for postgrad work," Rai answered. "But there's no record of any site like this, and no talk about unpublished finds like it. I'm not about to publish a word on it 'til I know it isn't another Piltdown Man joke. Don't ask why: let it sink in.

"Look down the declivity here, along the sides. Notice how the stones are stacked? That was a check-dam."

"Only on the sides of the gully?"

Patiently: "It went across, seven hundred years ago. Every few years, enough water comes down to make it a wet wash. Once a generation, a cloudburst comes through like a monorail express. By making check-dams you can capture enough silt and moisture to grow a few ears of corn here, some squash there. Maybe. It was a hard life."

He pointed to the nearside of the slope. "I walked to here before I saw something I'd nearly stepped on. A short digging stick, an antler fork socketed in a hunk of wood. The sinew wrap was long-gone, but somebody had dropped it right there above the high water area. Otherwise the antler socket wouldn't have stayed together.

"I ran my touch routine; it had been dropped in a hurry by some kid who was overjoyed to drop it. All I could get from it was a lot of sadness and fright, with that brief surge of happy vibes just before it was dropped. From the size of the stick, it must've been just a little fellow.

"Well, people didn't cultivate check-dam plots beyond their personal habitat range, so I started looking around. And there was Oshara,

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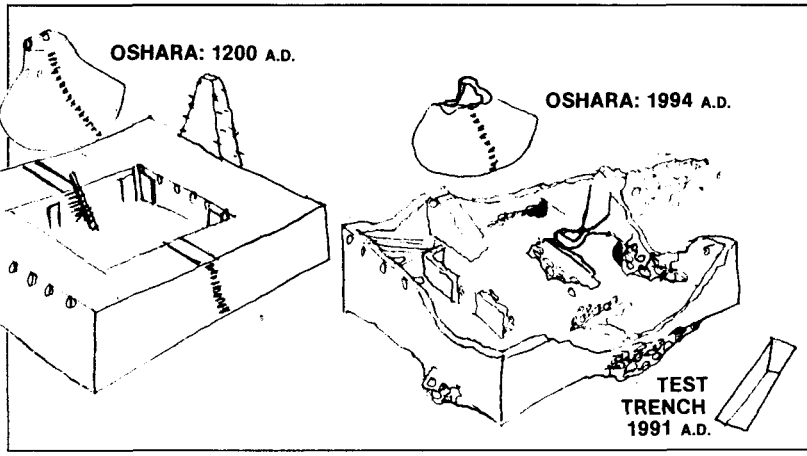
just over the hump in that depression. Well-placed; you can walk right past and not see it, but they built it well away from the wash. Smart, for a bunch of kids."

Rai led the way back to the site, approaching this time from the northwest. Now the circular structure was prominent, rising like a broad cone frustrum. It had once had a vertical story above the present top, making it virtually unique among kivas, said Rai. Other major details failed to tally with the Anasazi: kivas were normally to the southeast of the houses; they never sported turrets; and so on. Rai eventually realized he was overloading the others with data.

"Why don't I show you the radar pictograph," he asked rhetorically, and led them to the tent. "I don't know the first thing about electronics, but I can push a button with the best of 'em."

Radar pictography, a development of side-looking radar, required equipment which Rai had borrowed briefly a year earlier. The transceiver tower had long since been returned to Albuquerque, but the data tape and final computer-generated picture were Rai's own. He unrolled the paper tube, tacked its corners against the makeshift plywood table in the tent. Suddenly, Oshara made sense.

The ruin was clearly outlined from a vantage point twenty meters high, fifty distant. Rai had drawn thin pencil lines on an overlay. When he placed his reconstruction over the pictograph, they saw a ghost of Oshara as it might have looked in the year 1200. Oshara, without exterior doors or windows, had surrounded an inner courtyard. Midway along it on two sides, load-bearing walls had supported vigas at midpoint. Stone slabs had evidently been set as ladder rungs into the walls. That way, Val realized, someone could walk across



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the flat roof over a solid wall instead of the less-secure adobe overlay.

Rai had found no external traditional ladders, only one inside. On the radar pictograph was a long shadowy pile of debris stretching from the northeast wall. Rai's overlay showed a stone smokestack, rising five meters above the roof.

The kiva had looked like a castle tower rising from its conical base with another stone ladder built in. Dotted lines on the overlay revealed the existence of two tunnels. The short one ran from the kiva to the nearest and largest room of the house. The other ran east from the same room, extending beyond the overlay, sliced neatly by a trench that was obviously recent.

Altogether it was a very sensible plan—and strikingly unlike its contemporaries in many details. Rai suspected that the stone lining of the short tunnel had been added for water storage. "But I seriously doubt they'd have used it as a tunnel when it was full of water," he guessed. "Swimming, especially underwater for ten meters in pitch dark, isn't a common skill hereabouts. That's something you might help me with."

Laura: "Is there some prohibition against it?"

Rai: "No-o-o-o, but like slackwire walking, it probably wouldn't occur to them. Fish swim, birds fly, people walk. It's that simple."

"It's worth some thought," Val agreed. "Isn't that chimney a little unusual?"

"A *little*?" Rai laughed at the understatement. "You should see the oven it leads up from; a technical breakthrough! The damn thing has a venturi section before it turns vertical, and the stones on top at that point must've been cherry-red when it was working. They imported some different stone for that section; from the stack of spares they must've replaced the top slab regularly."

"Could the glow have been for light?"

"Very good," Rai conceded. "But I doubt it; there are easier ways like candlewood and oil lamps—still, I hadn't considered that. Jesu Maria, you two may be worth your keep!"

"Sire," Val murmured, with an exaggerated hand-flourish.

"Why don't we build a fire and find out," Laura said quickly and, Val thought, perhaps competitively. Val fell silent, irked that Laura might have been competing against Val herself.

"We'll do that when I get the smokestack rebuilt," Rai agreed. "Since they dumped most of their trash in the arroyo, this is like rebuilding a three-dimensional puzzle with pieces missing. But we can chalk up the fireplace as another brilliant innovation by the Oshara children."

Rai was also bemused by the long tunnel which, he estimated, had taken years to complete. It had not been started as a ditch and roofed over, as Basketmaker and Anasazi had done for ventilation shafts.

Val: "How can you be sure after all

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this time and all this erosion?"

Here, Rai was pleased to have some answers. "My test trench shows the soil above the tunnel was never disturbed; no crossbeams or slabs either. Besides, after a few years there's either a slight mound or a depression where the earth was replaced. Nope; they went to lots of trouble to be sure the tunnel didn't show from above."

He was describing an escape tunnel, he thought; probably the best defense a child could have against Navajo or Apache raiders. "Of course it's possible they had some offensive weapons," he said, and hesitated.

"Were bows and arrows common here?"

"Fairly. But in Albuquerque, Val, you reminded me about old weapons; it could tie in with what I took from the kiva firepit recently." He described the metal ratchet with pawl trigger which he had found and sent for analysis. "My expert guessed it was part of an old Spanish wolf trap. He doesn't know it burned about 1260 A.D., and he wouldn't believe it if I told him."

"What else could it be?"

Rai shook briefly with the *huh-huh* amusement of puebleños. "Well, yesterday it crossed my mind that it could've been part of a gun. But the barrel would still be there. Anyhow, there aren't any sulphur deposits near. Or nitrates, so far as I know."

Laura, who seldom forgot the most trivial thing she learned, would not let it drop. "Turkey droppings have nitrates. And how about pyrite for sulphur?"

A long pause, full of good-humored vexation. "Charcoal's no problem," Rai muttered. "Oh, I suppose—it's possible."

"But you don't think so."

He smiled. "I don't know what to think. A gun is even more outrageous than," and his brows jerked up with the final, "a crossbow!"

Val, who remembered her English history, thought the crossbow a step backward from the longbow.

"Not as a close-quarters defensive weapon," Rai said. "A child could cock a crossbow with his legs and double the stored energy he could manage with a longbow." He rubbed his nearly whiskerless chin. "Maybe I should take another look at my polaroids from the firepit. It's no crazier than half the other things about Oshara."

"Didn't you feel anything about the steel mechanism," Val asked.

"Not a twitch; clean as a lava chunk," Rai admitted. "Whatever I feel, I can't feel it when the sample's been through a fire since it was handled. Which reminds me," he said, replacing the vellum, "let me show you something else."

Presently, rummaging in specimen trays in the mobile home, Rai opened a small box to reveal his rectangular tiles. "Don't touch 'em," he cautioned, as they gleamed white under lamplight.

Val saw the fine lines etched in

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angular patterns across the tiles, spied a faint yellow sheen, hair-thin, in one line. "I give up," she said.

"Me, too," Rai sighed, unfamiliar with etched circuitry. "Some sort of amulet, I think, with gold melted into the lines and melted out again. Absolutely unknown in these parts. But look here," he whispered, turning one piece over with a tweezer. "A little kid made this one."

Before its firing, the tiny hunk of ceramic had been handled by fingers that could only be those of a child; for the whorls of a small fingerprint had been captured, to become vitreous evidence that might last a hundred millennia.

Laura asked Val to keep looking at the piece. "Somehow this makes them come alive," she breathed. "Why can't I hold it?"

"Obscures my feel for it," Rai said, a bit apologetically. "There were adults here from time to time, it seems; for trade, or some ceremony. I gather that because whoever handled this after it was fired was—" He shook his head, a grim frown passing quickly across his features.

Laura stiffened. "Rai, hold it; feel it. Whatever you do, take that tile and do it."

"I was going to say he was an old shaman."

"You were going to lie, then," Laura said evenly. "Unless shamans are loathsome people."

After a moment of regarding her calmly: "Lady, you are really something," he said. "Okay, but let me concentrate." He placed the tile on his fingertips, laid the fingertips of his other hand across it, composed his face.

He dropped the tile at Laura's bleat of terror.

Val moved to stand behind the taller woman, her hands gripping Laura's upper arms in protective custody. Under different circumstances the tableau of Valerie soothing a much larger woman might have been amusing, but Laura leaned back to extend the contact, grateful.

Rai Koshare tried to keep his irritation hidden as he tweezered the little tile away among the others. Rai was not an accomplished actor but, "I'm not sure all this is fruitful," was all he said.

But Laura was nodding, biting carmine lips. "Yes it is," she husked. "Very. I don't know how many people there are like the old devil who handled that tile, but there are two like him at San Saba."

Rai considered this, not fully understanding. "Well, the Medicine Society has a shaman who's nearly a hundred. But he's a decent old fellow—"

"That's not what I mean. Is it possible to live a hundred lifetimes in your head and still be only a child? An evil, inhuman changeling? It must be possible here, Rai. I'm frightened."

"Those two boys in the pueblo," Val surmised.

Laura started to reply, stopped as her chin quivered. She began to

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whimper almost noiselessly, hands over her mouth, her head nodding in affirmation.

Val murmured condolences, her fingers gentle on Laura's temples, and these attentions had gradual effect in the rear bedroom; eventually Laura slept. Val found Rai Koshare at the ruin, applying adhesive to a stone he had fitted back into the chimney, and offered an explanation that was half apology. There was no point in denying Laura's delicate emotional makeup and Val did not try. She had seen Laura in tears a dozen times while working with disadvantaged kids, chiefly after a stormy session with a vindictive child.

"Think of her as a highly tuned instrument," she told him, "that gets out of whack if you shake it hard. And make no mistake, that experience she felt through you shook her thoroughly."

"Whatever you say," Rai answered glumly. "But if she felt it through me, why didn't I feel just as bad?"

Val squatted, reached to hold the slab in place as Rai sought the next piece in his stone puzzle. "Because she has this double-edged ability to amplify the nuances in our heads," Val said almost sadly. "But there has to be something there to amplify. Tell me: what *did* you feel?"

Rai hunkered back, tossed and caught a stone with the aimless energy of a man who cannot stay idle. "I felt Oshara," he said simply. He started to expand on the statement, then shrugged and selected another stone.

"Don't be cryptic," she pleaded. "We need all the candor we can rake and scrape, Rai. I think you'll be glad we came if you know exactly how things stand. Laura's sensitivity? Sure, sometimes she's—frankly, a pain in the ass; but you take the bitter with the sweet. She's also very special."

Rai did not risk the answer that might reveal his growing concern for Laura. It went beyond physical infatuation. "I'm not sorry you came," he said, knowing it sounded gruff, softening his tone. "In fact I'd like you to read my journals of the dig; and I need to go back to the pueblo for Simes while you do it. May take a day or so, but you'll get a better feel for Oshara."

"Speaking of a better feel, I still want to know what Oshara feels like—and why it upsets Laura so."

Rai had never concretized it aloud, and faltered in the process. The artifacts of Oshara, he said, sometimes gave him an impression of childlike terror and avoidance; sometimes of a cold inhuman ruthlessness that was wise with experience; sometimes both. He had a dozen sets of immature fingerprints on the adobelike wall plaster, more still from potsherds, some from discards that were never kiln-fired. In one case he matched the print of a frightened child who had made an imperfect bowl and years later—to judge from the expansion of

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the print—had handled some tiles which had never been completed.

"The same kid because the prints are the same," he said in exasperation. "But someone very old, rapacious, mean as hell, handled those tiles a lot too, without leaving physical prints. I haven't found one adult print on the site. But let's face it, Val, kids don't have that kind of—" He paused.

"Mature, hungry evil," Val supplied. "That's what Laura said before she fell asleep." She picked up a stone, her tongue protruding from her teeth, and wedged it into a space; glanced at Rai for confirmation.

"Perfect fit," he approved; "you'll go far. I guess 'mature evil' is a good description of the Oshara feel. But I have absolutely no proof other than my knack, that any adults even visited here. Why did that mature *brujo* visit," he asked as if to himself.

He went on talking as they worked. Oshara needed a child sociologist to gnaw on analytical questions while Rai completed the reconstruction. With most digs, a few test trenches and a ten percent reconstruction gave suitable data for a site. Not Oshara. He had found no evidence of trade with shell, cotton, or artifacts to suggest Oshara's connection with any other settlement. He had only hints that Oshara had assimilated Mesa Verde techniques. Since Pueblo Bonito was closer, he had expected cultural connections there.

"I wonder: were Osharans afraid to deal with near neighbors?" Closer to a tactical truth than he knew, Rai changed his tack for a personal reason. "Some of those questions will jump out at you from the journals. Would you be okay alone here for the next couple of days? I'd drive back every night if you like."

With her growing interest in the chimney reconstruction, Val agreed, only half aware of the question. In desultory fashion she even looked forward to scanning the Koshare journals, separated from her familiar world by the sprawling land and the ancient topic.

Three beers and a masonry course later, the shadow of the northwest wall crept across the chimney and Val stepped back to admire their work. Rai chose that moment to complete his request. "It just occurred to me," he lied, "that Laura could help me at San Saba. The radiophone, checking out those kids; you know," he added vaguely.

But Val did not know. "I doubt if she'll want to monitor those boys. You can ask her. What the hell," she said.

A grunt from Rai. They trudged to the mobile home to wash and found Laura alert, refreshed from her long nap. Val hid her surprise when Laura agreed to return with Rai, innocently pleased that her two friends were warming to one another. The corned beef and cabbage tasted of old tin can but no one minded. By nightfall, Rai had assembled his journals for Val, spent an hour alone at his tiny lab in the kitchenette.

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The potsherd he had bought in San Saba, he found, was indeed quite recent. Clay and tempering grit were typical San Saba ware; obviously its provenience was not Oshara. And yet—his fingertips queried the piece, and it had the Oshara feel. He looked up to see Laura's eyeless attention on him, a wholly unfathomable and lovely face in repose. He presumed she was monitoring his suspicions about the potsherd, allowed a simple thought to blanket scholarly matters: *incredible woman.*

The marvelous mouth composed a smile. He said nothing, stowed his lab equipment, put away the potsherd. It had been a good day, he thought; the best. He would see that tomorrow would be even better.

Val did not entertain misgivings about her lone occupancy at Oshara until the next morning, as Rai transferred instruments from the pickup to the mobile home. To save time he had elected to take the rougher, more direct route to and from San Saba. Laura said little but her mood was clearly buoyant. It was, after all, something of an adventure for her to be separated from Val in this country. Val chided herself for a nagging worry, reflecting that Rai would be hardly more than an hour away. Once, Val had been fitted with a mastoid-implanted radio—a temporary and temperamental gadget—but today she would be without any communication device. *Worrywart*, she told herself; *that makes it an adventure for me, too. Smile, dammit!*

"Don't forget the canned ham," she called as Rai helped Laura into the Datsun. She quickly added, "Unless you can't eat it."

Rai leaned from the cab, grinning. "Whatever my colleagues from Brigham Young may say, we're not from the ten lost tribes of Israel. I love ham." He started the engine, waved, then headed southeast.

Laura's wave was perfunctory; a good sign, Val insisted to herself. High time Laura made herself more independent. *Then why do I feel neglected?* She muttered an angry expletive to her inner self, wandered over to the ruin. She would replace no stones without Rai, but it wouldn't hurt to study them before hitting Rai's journals again. In all this solitude she could even strip and get a bit of tanning. Pleased with her idea, she began to shuck her skirt and blouse as the Datsun's dust faded.

Rai kept El Huerfano Peak over his left shoulder and ignored his dash-mounted compass, content to run by dead reckoning for a time without conversation. He saw that Laura had left her concealing sunglasses in her shoulder bag and felt honored in some inexplicable way. Laura's was a strange loveliness but, despite the occasional glances he swept toward her—as though tasting her beauty—Rai knew his fascination was the cleaving of like to like. They shared an exotic quality, he with his fingertip intuition, she with her own tacit knowledges. Their internal

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languages might differ, but they were only dialectal differences.

"We're crossing the trail to Nageezi," he said, jouncing with brio through a set of vintage ruts.

Laura, laughing, her hands braced against the dash padding: "It felt like we were dropping into a canyon!"

"You haven't seen Escavada Wash," he rejoined; then in confusion, "Sorry 'bout that—but you *do* see," he ended lamely.

She licked her lips; he found it erotic. "More than you think," she said. *Deliberately* erotic.

"I, ah, was surprised you, you, you wanted to come with me," he said, and wished there were a pauper's home for poor phrasing.

"I felt the same about you," she replied. "Most people treat me like a freak. You don't. I like that."

He angled down a shallow dry-wash, downshifted, enjoyed the sensation of physical and emotional freedom. "Maybe we're freaks together," he said when he had climbed the opposite embankment.

"I meant this," she said, passing her palm across the smooth expanse of forehead above her nose. He saw the gesture peripherally, gave a grunt meant to be one of dismissal. "But you seem to like it," she persisted.

"I suppose I do," he said with an idle one-handed gesture.

Laura reached for the hand, found it, laid it over her face. "There," she teased. "You've been wanting to do that."

He found himself galvanized by this special intimacy. He braked, killed the engine awkwardly with his left hand, shifted to face her. "Damn you," he whispered, "if you know so much, you know what I really want to do."

She allowed his hands to cup her face, placed her own hands over his. "I like that, too," she murmured, and felt his mouth against hers, firm, ardent and inexpert. "Relax," she smiled, her fingers moving toward his hair. Then she gave him an exquisite thirty-second demonstration in kissing.

His progress was remarkable, but: "I have a lot to learn," he breathed, stroking the plentiful pale tresses.

"Val is a good teacher," Laura said amiably. She sensed the sudden reserve in him. "Does that disturb you? It shouldn't."

"Why ask? You probably know already. Does she feel about you the way I do?"

She leaned back against her window, one arm languid on his. "I used to wish she did." Softly, wonderingly. "But I was the instigator, I'm afraid. Neither of us has anyone else who cares much about what's inside us. She's the only person I have ever known whose mind doesn't have 'KEEP OUT' stenciled across it. Until you," she amended.

He laughed, waved a hand helplessly. "What did I have to hide?"

"Exactly. But now you *do*," she said, and suggested that he resume driving.

Rai started the Datsun with reluc-

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tance, listened as Laura revealed the depth of Val's response to him. Rai, who had accepted a solitary way of life, took the news with both a glow and a twinge of regret. He admitted that, had Valerie Clarke come alone, he might at that moment have been making overtures to Val back at Oshara, and to hell with San Saba's problems for the nonce. He refused to pursue the ifs rigorously. Whatever his potential relationship with Val, in Laura Dunning he had found both a phychic need and its sweet indulgence. And how were they to bare that to Val? Rai deferred the query to the one who knew her best.

"We won't tell her for awhile," Laura decided. "I think she'll guess, eventually. It's probably the easiest way." For Laura, it was certainly that. It was also an unconscious cruelty that she would not have practiced with deliberation.

Rai's request for Laura's company had not been entirely disingenuous. For the next twenty minutes he guided her in the use of the phone; queried her in the collection of stool and urine samples. Presently they neared an ancient waterworn scar in the earth, in some places over thirty meters deep and hundreds wide.

"Escavada Wash, ho-o-o," he sang out playfully, and swung the wheel to make an oblique approach. It was then that he saw the pristine gleam of a cable, hair-thin in the morning sun, stretching completely across the wash to the east. Distracted by the instant glimpse, hardly more than a flash, Rai failed to see the sandstone slab before the left front wheel slammed against it. The little pickup recovered with a bounce and slide, now nosing directly downhill. Laura vented a yip; Rai eased onto the brake, regaining some control, and jounced the vehicle onto flat terrain in the bottom of the wash.

Now a leaden metronome pounded the chassis with each revolution of the tires. Rai pulled to a stop immediately, slapped the steering wheel with the flats of his palms. Then, with a muttered apology, he pulled driving gloves on and stepped out to squat beside the Datsun. The trouble was not hard to find.

"I've bent a wheel with my goofing off," he said, stepping back to unlock the bed cover. "I'll only be a couple of minutes."

The integral chassis jack creaked down with the help of a swift kick; the single-point hub lock was easier. In only a bit over the promised time, Rai had exchanged wheels, re-stowed the jack in its clip, tossed the damaged wheel behind the cab.

Rai stepped to the cab again and squinted eastward up the autoclaved flank of Escavada Wash. He could not see the cable now but a dark speck floated without visible support ten meters above the arroyo floor. It had to be supported by thin cable, Rai knew, and he struck all too near the mark with, "Must be some new communications gear."

"Who lives out this way?"

"Nobody. When Western Electric

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speculates, ma'am, they *really* speculate!" Then he saw the boy squatting perfectly still in the open, two hundred meters up the wash. "Well I'm damned," he chuckled, and called out in San Saban.

Laura sat quietly, absorbing only fragments of the encounter. Rai's tone was hearty, unruffled. Evidently he had recognized the boy with the dusty denims, heavy handmade footwear and long, full-sleeved shirt typical of the area. The boy turned—stoically, Laura thought as she monitored Rai's vision—and called out. Presently a second and smaller boy trudged down from a concealing outcrop farther up the wash. He cradled a rifle. Rai met them halfway.

The three Amerinds stood and talked; Rai at ease, the boys less so. Rai asked about the cable and laughed, the gruff Keresan bark unlike anglos, when he heard the answer. When the second boy grasped the other's hand Rai was shading his eyes, peering up the wash. The boy with the rifle stepped casually to one side, behind Rai, the rifle swinging up. Then Rai turned back, swept one gloved hand out in a lightning motion and plucked the little rifle from the boy's hands, holding its short barrel vertical. The rifle fired once, a thin report that sent flat hissing echoes from the slopes of Escavada Wash.

The next interchange was not so jovial. Rai held the little weapon, muzzle down, with one hand and ignored the plea of the smaller boy. When he had emptied the clip of his rifle he flung the cartridges across the wash, then handed the weapon back to the boy.

Presently Rai returned to the pickup in a mild distemper, started the engine. He paid no attention to the boys scrambling up the arroyo because he could not know of their companion and the transceiver, hidden among the rocks.

"What did you get from that?" He was perfectly willing to believe that Laura's ability was boundless. The pickup nosed up the other slope like a bloodhound.

"Not much; you were too far off. What was the trouble?"

"Couple of San Saba kids. I recognized a red-on-white clan headband and it turned out to be Carson Kimbeto. The little one is, um, Hatchi Leon, I think. They've suspended a bag of rocks in the air for target practice; Man Above only knows where they found that cable. Or why they're a day's walk from home. Browned off at me right now; they even refused a ride home. They'll be okay. No trouble."

"Gunfire is no trouble?" Mild reproof lurked in her question.

A snort, an anglo laugh. He continued his shorthand speech, concentrating on the terrain. "Fool kid. Doesn't know how to handle a twenty-two yet. I saw his finger in the trigger guard; second nature to keep an eye on the muzzle. Just an accident. Teach them both a lesson."

Laura sensed no lack of veracity in Rai, considered a reply, then considered again. She was already on record about San Saba children and did not want to risk her credibility with fresh alarms. In any case, they had

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been too far away for clear sensations. Perhaps she had simply mistranslated the Four-Corners mind. For a fleeting moment, Laura thought, she had detected an impulse toward a cold and casual murder by a child who was no child at all. Still, Rai had suggested no taint of evil in the rifle. Laura relaxed; she had not considered the fact that he had been wearing gloves.

Within the hour, Rai took custody of a package brought from Gallup by a priest who lived in White Horse. This informal express service, he thought dryly, would last until the day some postal service nabob realized how badly his system competed against plain rough-country goodwill. Rai carried the package into his 'dobe, beginning to appreciate how little assistance Laura needed so long as she could share his eyesight.

He slid a long locking-blade knife from his hip pocket, flipped it open with practiced legerdemain, ran its wicked blade along the glasstape seams.

Laura: "Lord, what a weapon. Aren't switchblades illegal?"

"Yep—and common as clay hereabouts. But this is legal; no spring-loading," he said as he folded it away, "so it's officially no weapon." The crossbow image flitted across his thoughts again, replaced by immediate problems as he drew a six-pack of squat flexible jars from the package of a hundred or so. Struggling with a lid: "Can't even open the durn thing."

Laura showed him how. "They're usually sterile until the lid's off; definitely not on the return trip," she smiled. "Identify the donor if possible and make a note of possible contaminants. Analysis could show heavy metal traces, for instance, if you took it from lead-lined plumbing."

This precaution had not occurred to Rai, who was becoming increasingly nervous about the whole operation. He debated the merit of confiding in the few San Sabans who, he thought, might be willing to donate specimens. But they might also talk about it, which would surely eventuate in a visit from the Clown Society. Rai sighed and rethought his original plan: walk around with an absent expression to see where puebleños casually voided themselves. He would see few if any women or girls at it. A few men; still more boys, probably. Then Rai would—he would—he did not know exactly what. He was certainly not going to commit petty theft from the privies, even if it made a cockeyed sort of sense. The risk was much too great.

After a brief lunch with strong coffee, Rai left Laura in charge of the 'dobe, his pickup parked so near the front door that she could not miss it if the phone buzzed. He strolled over to buy a coke, nodding to this or that person as they moved steadily through the heat like tired swimmers. Mad dogs and anglos, he reflected; he would find few kids playing in this noon sun.

Then he remembered the midden, San Saba's venerable dump where discarded signs and plastics shared space with cannibalized auto bodies. Kids

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often found or made shade while at play in the huge midden west of the pueblo. He went back to his 'dobe, found an empty mason jar, filled it halfway with water.

Laura lay on a pallet, daubing at trickles of perspiration, content to rest. "You're a coffee freak," she accused from the next room as he poured a bit of coffee into the jar.

"Faking illegal booze," he replied. Sober men might need a reason for touring the midden in such dazzling heat. A half-liter of rotgut in a mason jar would contain its own reasons.

Laura's admiring laugh followed him outside. He adjusted his broad-brimmed hat, walked slowly to the dump a half-kilometer away, idly wondering if he were being entirely fair to Val Clarke. Even on such short reacquaintance, he felt himself more at ease with Val than with any woman he knew; Laura included. If only she had Laura's singular quirk, he might—but Val was what she was. He liked her that way. He carefully avoided thinking of Val in terms of strong affection. With Laura around, that branch of thought would yield bitter fruit.

He turned his attention to the midden, heard a merry shout from somewhere inside it, and knew that he had been spotted by now. He took a swig from the mason jar and sat down cross-legged where he was.

Within ten minutes his backside was baking, but he had glimpsed several children in the graveyard of San Saba artifacts that stretched over an acre of useless ground. Here and there he saw spindletop weeds poking up from debris. High weeds needed moisture and fertile soil. He imagined a momentary rain shower, the rivulets that might sink into the soil where—with occasional shade and fertilization—a resolute weed might prosper.

Applying this fancy to his immediate problem, he stood up and shambled over to the burnt and rusted hood of a once-proud Chrysler. It was too hot to sit on, but he leaned against it and sipped. Human excrement dried quickly out here, and in a day or so would have no odor. Yet he smelled a familiar ripe purulent presence. In due time he found its source. In a narrow cul-de-sac between piles of trash was a spot box-canyoned by weeds. In the center was a placer deposit of human offal—obviously used by several people with regularity.

He leaned back against a protruding wooden post, aware that a small boy, hardly more than a toddler, eyed him in solemn awe from the flying bridge of a decayed Buick, a stone's throw away. He sipped at his tincture of coffee, sat heavily, used his peripheral vision. The child had already lost interest; was already scanning his horizon for imaginary cowboys or asteroids. Rai smiled to himself and, for a moment, wished for Laura's talents.

Rai Koshare refused to dwell on the ludicrous aspect of San Saba's most educated resident in an elaborate charade to pilfer dung from children. After considerable thought on the mechanical operations, he staggered over to the offal; shucked down his denims,

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squatted; and spent the next furtive moments filling four of the containers from existing deposits around him. Well, he reflected, there are givers and there are takers . . .

The containers pocketed, he reassembled his clothing. He saw moisture in the curved remains of broken crockery among the weeds, realized someone had urinated there very recently. He removed the tops from his remaining two sample containers and placed them among the crockery, barely out of sight. Then he took his mason jar and moved off thirty meters or so behind a hummock where, without seeming to, he might rest and monitor the area. One thing puebleños did well, he thought, was wait. Then like a fool he fell asleep.

He would never know what awakened him but Rai was suddenly aware that he had been dozing, and that someone was moving away from the open privy. He recognized the Dinay boy, zipping his denims as he trotted into the wilds of the junk heap. Evidently Chuzo had arranged for someone to tend his small flock of sheep that day. Chuzo Dinay's whole body was intent on his errand.

After another minute, Rai inspected his containers and was amused at his own elation. One of them was a quarter full of yellow fluid.

He marked the urine container hurriedly and moved off, remembering to bring the bogus booze. There might be other areas in the midden to be mined, but he needed more containers. The specimens should be returned to Jeff Simes in Gallup; Jeff had not mentioned whether they had to be very fresh or not.

En route back to the pueblo Rai thought again of Val Clarke, wondered if she were regretting her solitary occupancy at Oshara; hoped his journals weren't too cryptic. He was struck by the awareness that he greatly valued her opinion.

Laura snored like a puppy on her pallet, beads of perspiration on her face and shoulders, and Rai elected to let her enjoy her siesta while he used the Datsun phone. Simes was out but his no-nonsense assistant said she knew of the specimen collection. She suggested that a second specimen was no farther from Rai than the end of his arm, and could they come for the specimens? Rai offered to leave his six-pack with the priest while shopping in White Horse. It was a common ploy, the priest a waystation between competing cultures.

An hour later, Rai returned from White Horse minus the specimens, with food and a remounted spare tire, to find Laura awake and out of sorts at being left alone. She allowed him to make amends and, perhaps inevitably, it ended on her pallet in a squirming lubricious delight that left Rai spent all too soon. Laura made no elaborate complaint. Her, "I thought archaeologists were slow and methodical," was ambiguous enough.

"We'd better start back to Oshara," Rai said, with guilty concern for Val, and made ready for the trip.

In another five minutes Ziu Tiamunyi squatted atop the midden at San Saba

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and watched the Datsun's python of dust writhe northward. "North," he confirmed as he wiggled down into the dugout with the others.

Chuzo Dinay gestured for hand links. Tiamunyi grasped the hand of Mateo Betan on his left and the smaller hand of Naka Flores on his right. With Dinay in their tactile circuit, they lacked only the three who had been surprised at Escavada Wash. As the member slated to make the next host transfer, Dinay would soon be more vulnerable than his fellows. By age-old agreement that made him leader *pro tempore.*

Carson Kimbeto has hidden the beacon hardware, Dinay reminded them, *but Encino Mangas and Hatchi Leon have not returned from backtracking the pickup. Kimbeto thinks the archaeologist was satisfied with their explanation.*

Then why was he loafing around here today, came Flores's question to worry them anew.

Betan: *The child said Koshare was drinking, perhaps depressed. I did not see him; the child could have been mistaken. It is not Koshare's way to drink that way. Perhaps Mangas should have killed him after all.*

Dinay, who had heard of the confrontation from Kimbeto's transceiver, was no longer certain it had gone well. The users could not know of Laura's special advantages, considered her as they might any tourist. *Perhaps, perhaps. But the anglo woman might have driven off to testify, and then where would our executioners be?*

Flores: *In new host bodies.*

We cannot squander host children, Dinay replied. *My concern is with Koshare's snooping above Escavada Wash.*

Their transceiver, a small commercial unit with an optional scrambler circuit, lay before them, its antenna patched to a wire leading from the dugout. Now it spoke in San Saban. Dinay answered, alert to tension in the voice from Escavada Wash.

Carson Kimbeto: "Mangas ran ahead of short-legged Leon to tell me the worst for relay to you. The archaeologist Koshare has set up camp at our old place!"

Stunned glances in the dugout. "The burned place?"

"I said the worst! Yes, the laboratory site. I knew we should have erased it long ago."

"Put Mangas on," Dinay ordered.

The piping voice of Encino Mangas labored through exhaustion of a child's body forced to run for kilometers. He confirmed the news: a slender half-naked anglo woman puttered about on the site where the users had worked and planned so long ago. From the look of it, Koshare had been there many times, was amid long and serious study. Mangas ended by saying, "We think the anglo woman is alone. If so, we can eliminate her. I have the rifle."

"Let us confer here, Mangas."

"Let us act here, Dinay. Quickly," said Carson Kimbeto.

The hand link was re-established in the dugout. Presently, Dinay flicked the transceiver on again. "Kimbeto, have you enough ammunition?"

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"Nearly a boxful," he answered.

"Begin by using some of it on Koshare and his blonde woman; they are moving toward you now. You can drive a car?"

"With difficulty. Then we can pick up Leon."

"Exactly—and drive to the old site and shoot the naked whore. Can you manage that?"

"I am good with guns," Kimbeto promised. Faintly off-mike, Mangas could be heard, advising Kimbeto that a yellow car was nearing the wash from the south.

"Koshare's pickup," Dinay guessed. "Have Mangas flag them down. If he seems distressed the fool Koshare will stop to help him."

"And then I do Leon's job properly," replied Kimbeto.

In the dugout, the users heard the clip being fed into a sporting rifle in Escavada Wash. Kimbeto was an excellent shot. He could put three rounds into Rai Koshare's body from fifty meters before the archaeologist understood the ruse. It should be no contest.

"We're nearly at Escavada," Rai announced to Laura over the thrum and rumble of the pickup. "Wonder where those kids got all that cable to hang a target across the arroyo? Cable isn't cheap."

The sun was near the horizon, glinting through wisps of high cloud that gave a bloody tint to the desert. "Let me make a detour; those kids may be playing with a Western Electric line after all," Rai said in preamble, then steered the Datsun eastward.

There was no road to veer from; Rai had merely been following his tire tracks for convenience. He failed to spot Mangas scrambling along the lip of the arroyo toward the tracks, concentrating as he did on his detour. In any case he would not have seen the canny Kimbeto, who nestled under the arroyo lip for cover; cover for two kills.

Rai's sudden maneuver took the users wholly by surprise. Kimbeto could not see and Mangas, ready to mime a broken ankle, stood crouching and inert. To Encino Mangas it looked as if Rai had seen him; was taking evasive action. Mangas and Kimbeto shouted, and Kimbeto whirled to sprint up the arroyo. The pickup must go slowly as it eased over the embankment; perhaps there would be time for a shot through the window....

The yellow Datsun was five hundred meters from Kimbeto as Rai drove along the lip of the wash, eyeing the place for cable anchors or a public utility sign. Kimbeto had hidden the cable anchors well. Rai braked, stretched his head and shoulders outside the cab near the embankment lip for a better view of the terrain. Now Kimbeto was three hundred meters away, his thudding footfalls masked by the staunch little engine of the pickup. Rai let the clutch out, still craning his neck, now only two hundred and fifty meters from the rifle; now two-twenty-five. Carson Kimbeto took three gasping breaths to hyperventilate, stopped, aimed from two hundred meters. Not an easy shot but better than nothing.

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Or far worse. The front wheels of the Datsun sloughed over the embankment, dropping the cab a half-meter at the instant Kimbeto's slug moaned through the open window leaving a bright streak across the windshield from the inside.

The report of the twenty-two caliber rifle was almost lost in the noise of Rai's progress, but not quite. Rai ducked back into the cab, saw the metallic scar left by the deadly little slug, made a turn farther to the right, heard the *whap* and whine as the second slug ricocheted from his rollbar. "Get down, Laura," he bellowed, his right hand pressing her shoulder toward the seat.

Subliminally he knew the direction of fire was somewhere behind him. Rai accelerated as much as he dared, slapping the gearlever from second to third, the yellow pickup airborne several times as it crashed over the arroyo bottoms. Now he was angling up the opposite bank, downshifting as he made a snap judgement to clear the north embankment lip without rolling the vehicle.

Two impacts, sounding like the single crack of a dry branch, announced the third slug which passed through the rear window and, on its way out, starred the windshield where Laura's head might have been. For one hallucinatory moment they heard only the crescendoed roar of the engine as the Datsun leaped the embankment lip. Then came the gargantuan *slammm,* the pickup bottoming every spring, a blizzard of dust rising inside the cab.

Rai blinked, not so much from dust as from the huge black fuzzball that threatened his consciousness. He was completely unaware that he had bent the steering wheel with his jaw.

"Stay down," he shouted, unsure whether he was beyond the marksman's range. He had enough wit to upshift by tachometer and fled across the desert toward the shadow of a low butte.

Gradually Rai Koshare came to realize he had put enough distance between them and sudden death, slowed to a pace that was not quite maniacal, urged Laura to an upright position.

To his great relief, Laura was almost calm. "If I had eyes, they'd be the size of saucers," she said, only a little shakily. "Was someone actually shooting at us?"

Rai vented his earth-tremor San Saba laugh despite his sudden headache, elated by the sweetness of life and breath. He drew a forefinger across the windshield, the nail barely registering the inlay of lead on glass.

Laura reached forward, her hand guided as much by incoming air as by Rai's vision, and placed her finger over the hole made by the third slug. The hand flew to cover her mouth.

"That cabroncito Hatchi Leon," Rai muttered, steering a course that would bring him back to Oshara and Val. "No, not a niño; that was good shooting even for an adult."

Laura was no help. "I didn't pick up any vibes," she said, "past yours; and I was trying. Must have been too far off."

"Whoever it was, he wasn't

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kidding," Rai said, reaching for his radiophone. At the moment, they were passing the user who was called Hatchi Leon. The small figure heard the pickup from afar, lay prone as it passed a kilometer away, then resumed a dragging walk. Leon was without radio or weapon, and could only wonder why the yellow pickup thundered past at such a gait.

In the wash, Kimbeto and Mangas knelt at their transceiver in a defensive dialogue that was passably human. "You were not here, Dinay," Mangas insisted through the scrambler, "and I was! Koshare took a wide detour the instant he saw me."

"And why should he do that unless he feared us," Kimbeto added. "I may have wounded them both."

The reply from San Saba was scathing: "So much the worse! Koshare has a radiophone and has probably used it by now."

"Can you steal a car to pick us up?" Hope was not a common trait in users, but some of it came through Kimbeto's tone.

After a pause, in cold implacable anger that *was* common: "Finish the job, Kimbeto! We cannot steal a car here. You are fresh; there will be light from Koshare's camp. Use it. Then you will have a nice yellow pickup truck to ride."

"That is the consensus?"

"Wait." Kimbeto knew that Dinay, Betan, Flores, and Tiamunyi would be conferring silently by skin galvanism, hands clasped.

Ziu Tiamunyi's voice confirmed that a group decision had been reached in San Saba's midden. "Dispose of the bodies in the old escape tunnel, Kimbeto. Touch nothing that you do not want to leave fingerprints on, burn everything that will burn. Then bring Mangas and Leon here. We expect you sometime after midnight. That pickup may be a useful tool to hurry the beacon work."

Kimbeto was sullen. "We will need help."

"You would waste time," shouted the voice of Mateo Betan.

"They are wasting it now," agreed the voice of their most suspicious member, Naka Flores.

"Call me when you have exterminated them," said Dinay. "An educated fool and two anglo *rubias,* blondes, should be within your capabilities."

The carrier wave winked from existence and, in Escavada Wash, two users traded shrugs that were half human.

Rai halted the little pickup, waving into the dusk as Val Clarke emerged from the trailer house. "Something's happened," she said. It was not a guess; she knew the set of Laura's mouth too well.

"Some crazy man playing cowboys and injuns," Rai said with his typical clumsy effort to belittle a problem. He had phoned to tell a deputy about the boys playing in Escavada Wash; laughed at Laura's guess that the two boys had done the shooting. Lugging a bag of groceries into the mobile home, he insisted it had been a fluke, the pixi-

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lated rage of some old prospector.

Val inventoried the groceries but paused to ask, "Is that why you were looking over your shoulder just now?"

"The sheriff said to be careful," Laura chimed in.

"Just a deputy," Rai said, patient and slow. "This area isn't reservation land, so I called the county sheriff. Asked them to check out the wash just in case. Those kids could get shot, you know."

Val nodded. "With a hovercraft and night-vision police scanners, I'll feel a lot better." She shivered, hugged her arms despite the warmth of the little dwelling.

"Val," Rai began in a long-suffering monotone, "San Juan County's equipment is twenty years old. They envy a hunter with an infrared scope like I envy Penn State's automated dig hardware. No chopper, no night sorties; they'll fly over in the morning. Next time we'll take the long way around and avoid the problem; okay?"

Val's manner belied her verbal agreement. There was something else amiss, she felt, and covertly judged the interactions between Rai and Laura. She sensed a reserve there, a cautious apartheid as her friends helped arrange the dinner Val had warmed. They were hiding a distaste for each other, she decided. Either that, or—but she pushed away the alternative.

Val solved the mystery of Rai's sudden headache when she placed a finger on his jaw. The lump, the bruise, and the probable cause led them to stories of stress behavior that lasted through dinner and into part of the night.

Rai had begun comic embellishments on his foray into San Saba's midden heap when he heard the buzz outside. "Sheriff's office, maybe." He was wrong.

When Rai stepped back into the trailer five minutes later, he was the image of consternation. "I know it was Dinay," he gritted. "Dammit all, there weren't any bugs there!"

Laura: "The deputy found someone?"

Rai waved a hand as if erasing a misconception. "No no, that was Jeff Simes, in Gallup. County Hospital has some reagent strips that can test a urine specimen instantly. Stools take longer. Well, Jeff says my own specimen looked fine but the other one was a laugher."

Val: "You mentioned bugs?"

"Specimen was full of protein, which they checked double-quick when they couldn't read my scribbling, didn't know whose it was. And I got browned off after Jeff claimed I'd mashed a beetle in a urine specimen. I told him I was a stupid injun who couldn't recall who the donor was."

The women were better versed in diagnostic procedures. Was Rai sure the donor had been the Dinay boy? He was positive. "He may be voiding pus in his urine," Val supplied. "That could be serious, Rai."

He leaned against the table, fingering his jaw tenderly. "No, Jeff says they ran further checks and found it was something called, uh, chondroprotein. Which, according to Jeff, is not

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featured in human urine, exclamation point."

"I don't recall hearing of it," Val admitted.

"I have," Laura said with the bright insistence of the trivia buff. "Chondroprotein is a family of proteins that make up, ah, tendon, cartilage, and something else."

"He said that," Rai agreed. "And claimed I gave him beetle juice."

"Chitin," said Laura in triumph; "*that's* what else! Rai, I think you have to face the idea that somehow the sample was contaminated."

"That, or it came from a bug in a boy-suit," Val teased. Then, seeing his face: "I'm sorry, Rai. Just be glad the specimen was negative for liver flukes or whatever."

Put in that light, it was cheering to Rai Koshare who was childishly glad he had refused to name the donor.

In San Saba this refusal had its repercussions. The users had monitored Rai's open channel, had heard his calls to the deputy and from the Public Health Service. Tiamunyi sat in the midden hideout, facing his fellows as they clasped hands for communion quicker than speech. *If Koshare cannot recall who was fool enough to donate a specimen,* he argued, *we are still safe.*

For how long? Dinay's rage crackled across their synapses. *Who among us knows the limits of their medical techniques, or what traces of us will show in the excrement samples they spoke of?*

The paranoia of their parasitic race surfaced in the suspicion of Naka Flores. *I gave no urine specimen! Which of you did—and why did you betray us all?*

Betan worked toward solidarity. *The man Koshare was snooping here today. Why must he do that if one of us is a traitor?*

The central fact, Dinay seethed, *is that the humans have stumbled on our trace. For all we know, there could be soldiers here by morning.*

Tiamunyi: *When the archaeologist is missed, they will focus on San Saba.*

Flores seemed bent on pessimism. *And what if they took us by force to undergo tests beyond the range of the serenity beam? Madness and death for us all!*

In the user of Betan ran a strong element of inertia: *You are forgetting that there is a fair possibility of coincidence,* he counseled. *I propose that we watch and wait.*

I say run, Tiamunyi voted. *If we wait, they can find us.*

If we run, they will hunt us, Flores fired back.

Dinay knew the signs of demoralization. *And if we are ingenious, they will mourn us in San Saba,* he interjected. *They will reject anglo science more firmly and we shall be more secure.*

The others waited.

It is time, Dinay went on implacably, *to manufacture a tragedy. The rest of you are milling like sheep. I have an appropriate remedy.*

Not a change to adult bodies, Flores quavered.

Chuzo Dinay was pleased to savor the moment. *Yes,* he replied, *and no.*

TO BE CONTINUED

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Quark Stars

Who knows what lurks in the hearts of stars? Here are some of the latest (and strangest) ideas

by MARGARET L. SILBAR

Twinkle, twinkle, little star,
How I wonder what you are,
Up above the world so high,
Like a bag of quarks.

This paraphrase of an ancient little ditty indicates a growing suspicion that not all stars are twinkling diamonds embedded in the black night sky, nor even necessarily clouds of incandescent gas. And, that some stars, twinkling as they do with X-rays and gamma rays, might not always consist of mundane neutrons and protons, but sometimes of *their* basic constituents—"quarks."

For, the central regions of some dying stars—stars which contain the densest matter in the universe—are now conjectured by some astrophysicists to be just "a soup of quarks." In fact, stars which are stable and made wholly of quarks might also exist somewhere out there, giving a massive aging star yet another evolutionary option on its long road to extinction.

The tale to be told takes place on the common meeting ground of the physics of elementary particles and that of the stars. As we have known since before World War II, the lives of the stars are dependent on the physical processes governing the infinitesimal nucleus. We shall begin by talking about the "ordinary" ways a massive star begins to die, proceed from there to the quark model as it evolved in elementary particle physics, and, finally, come back to the meeting of the two and the suggestion that quarks may live in stars.

It was a nuclear physicist, Hans

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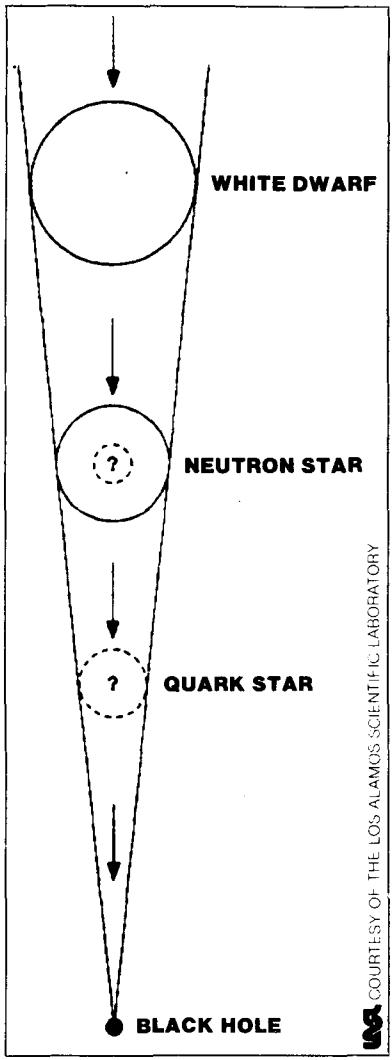

Figure 1. The "ordinary" options open to a dying star include collapse to a white dwarf, neutron star, or black hole. Now comes the suggestion of yet another option, involving quarks, either in the core of the neutron star, or in forming a whole new kind of stable star.

Bethe, who explained in the late thirties why it is that stars shine, and, in the explanation, forevermore connected the heavens to nuclear physics. Stars, he said, continually fuse hydrogen atoms into helium atoms in their cores, radiating the energy gained into space. It is, in fact, a star's thermonuclear furnace which keeps it, during most of its evolution, from collapsing under its own weight. The star delicately balances the energy loss from its surface with energy produced in the nuclear fusion reactions in its core.

But as an irreverent physicist rephrasing the laws of thermodynamics once quipped, "You can't win. Not only that, you can't even break even." This second law of thermodynamics, which doesn't allow breaking even, is a poignant reminder that the good life doesn't go on forever, that a star can never recover the energy it radiates into "the sink of space." Eventually, it becomes senile, having exhausted the hydrogen fuel that enabled it to shine for billions of years.

Gravitational contraction temporarily restores its equilibrium: potential energy lost as the star shrinks is converted into thermal energy. This gravitational contraction compresses the stellar gas and raises the temperature and density of the inner star. Its internal structure is altered, and other kinds of nuclear reactions take place, for a while. The delicate energy balance is destroyed, however. The aging star is doomed to collapse under its own weight, and it will become a white dwarf, a neutron star, or a black hole.

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Small stars, those about the size of the sun, die as cold white dwarfs. They brighten, their outer envelopes grow larger, and, finally, they shrink to a stable configuration. The central density of such skeleton stars can reach 10^8 grams per cubic centimeter (a grain of rice, if so dense, would outweigh a cow).

Stars with a larger mass (but one still less than two times that of the sun) become neutron stars. Such stars are even denser (some 10^{14} grams per cubic centimeter, which would be the density of a pinto bean containing—under very crowded living conditions—all the people presently living on Earth). Neutron stars, apparently first proposed by Lev Landau on the heels of the discovery of the neutron, are expected to have a radius of only 10 kilometers. They are often described as enormous "atomic nuclei" bound together by gravitational rather than nuclear forces.

Stars with a mass greater than two solar masses, have still more catastrophic ends in store for them. (Unless, that is, they can somehow, as for example in a supernova explosion, shed enough mass to get below this critical amount.) Their cores burned out, self-support impossible, their mass is crushed into a compact volume of immense gravity. A black hole is born. (Black holes might be born in still other ways, but however born are characterized by only three parameters—mass, angular momentum, and electric charge. This is known as the theorem, "A black hole has no hair.") Such holes may contract forever, and eventually "evaporate." (This, as we shall see later, has consequences for our story and perhaps as well, our primordial birth.)

It is gravity—as Einstein recognized in his general theory of relativity—which dooms the black hole to contract until it is, as in Figure 1, only a "singu-

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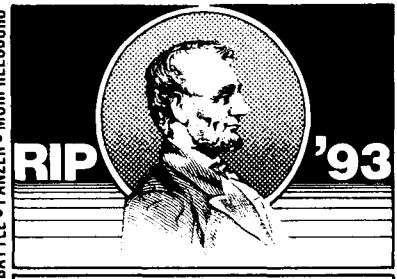

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larity" in spacetime. In contrast, the white dwarf contracts only so far. Then the enormous contracting push of gravity is offset by the pressure created by the rapidly moving electrons in its atoms.

The existence of such compact stars was one of the major puzzles of astrophysics as the century began, and its solution had to wait for the work of Enrico Fermi and P.A.M. Dirac in the mid-1920s. They worked out a quantum-statistical theory of the electron gas, containing as an essential ingredient the famous Pauli Exclusion Principle, which forbids two identical particles from being exactly in the same state of motion. As a star contracts, therefore, the electrons are forced closer together and, to obey the Exclusion Principle, some of them must move more rapidly than before. The greater the compression, the faster (on the average) the electrons move, and thus the greater the resulting quantum-mechanical counter-pressure. (Because white dwarfs are supported against their own self-gravitational collapse by the pressure of this "degenerate" electron gas, they are sometimes also called "degenerate dwarfs.")

The way to beat this electron counter-pressure, as happens when the mass of the collapsing star is great enough, is for Mother Nature to *remove* the electrons from the problem altogether. When matter is compressed to densities beyond those needed to form a white dwarf, the velocity of the electrons approaches that of light. The electron energy is thus so great that normal atoms are no longer stable. Everything in the star becomes topsy-turvy.

Under normal conditions, the proton would be stable, the neutron unstable, but, here, the opposite occurs. (Normally, a free neutron would decay into a proton, an electron, and a neutrino.) The neutron stabilizes, the proton becomes unstable. Thus, when negative electrons collide with protons bound in nuclei, the huge gravitational pressure provides the energy so that they react to make neutrons (and a neutrino, which quickly escapes into outer space). The more highly the matter is compressed, the faster this reaction proceeds, and, as the number of neutrons in the nuclei steadily increases, the number of electrons in the electron sea steadily decreases. In this way, a neutron star is formed.

But the neutron star has a spectrum of densities and encloses and enfolds "a large repertoire of physical phenomena." It is not a homogeneous object, but a layered one. It consists of dense ordinary matter on the outside. Inside is a region where nuclei become larger and more neutron rich and a still-denser region where the swollen nuclei merge and disappear as separate discrete structures.

The crust of the neutron star—most of which is rigid—penetrates about one kilometer below the surface. It is not this rigidity, however, but that of the superfluid sea (or "soup") of neutrons below the crust, which supplies the counter-pressure stabilizing the star from further gravitational collapse. This fluid is believed to have properties similar to those of liquid helium-3

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cooled to near absolute zero. It has become (as a result of a combination of the pressure of degenerate neutrons and their mutual repulsion at short distances) practically incompressible.

Near the ultradense center, it was once thought that neutrons might have arranged themselves in a regular crystalline lattice, as in a white dwarf, giving the star a frozen, or solid, core. (Could one only strip away the outer-layers, the coolest white dwarfs might be "diamonds in the sky," except with body-centered cubic lattices.) Astrophysicists now think the neutrons may have possessed so much energy that it was advantageous for nature to choose some alternative form of matter, for example, to convert them into still other elementary particles. If so, it is here that one may find quarks and other exotic particles, a suggestion we will return to, after a few words about what a quark is.

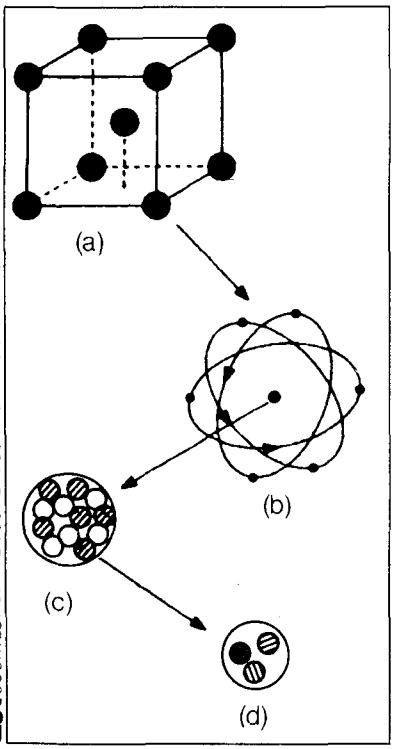

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Figure 2. Successive steps down to the submicroscopic world: (a) A body-centered cubic crystalline lattice of carbon atoms, such as may be found in the core of a white dwarf. (b) The carbon atom, consisting of six electrons and a nucleus. (c) The carbon nucleus consisting of six protons (shaded) and six neutrons. (d) A proton, consisting of two proton-like and one neutron-like quarks.

In the early sixties, there was no theory that could successfully explain the plethora of elementary particles (at that time, up to 300 different particles, each having perhaps as much right as any other to the title "elementary") in terms of something still more basic—at least not as an atomic nucleus is explained in terms of protons and neutrons, or an atom in terms of nuclei and electrons. Thus, the times were ripe for Murray Gell-Mann's suggestion that the proton and neutron are really formed, as in Figure 2, from a triplet of still more fundamental particles—or "quarks." (The name "quarks" was taken from a drinking song concocted by James Joyce in his novel, *Finnegan's Wake:* "Three quarks for Muster Mark.")

Particles, Gell-Mann said, in a now famous paper which appeared in *Physics Letters* on April Fool's Day 1964, can be built from a combination of

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quarks. In the beginning, each quark was analogous to an already well-known particle. There was a protonlike quark, a neutronlike quark, and a third "strange" quark (whose particle analog was the lambda particle). For each of the quarks, there is an associated antiparticle, or "antiquark." The unique signature of Gell-Mann's quarks (and antiquarks) was, and is, their fractional electrical charge. The protonlike quark has a charge $+\frac{2}{3}$ that of the electron, and the other two have charge $-\frac{1}{3}$.

In this scheme, a proton, for example, can be thought of as two protonlike and one neutronlike quark bound together by a new kind of force. Summing up the electrical charges of its components, the proton's charge tallies, as it ought, up to 1, that is, $(+\frac{2}{3}) + (+\frac{2}{3}) + (-\frac{1}{3}) = (+1)$. The neutron, so important to our story, is another combination of three quarks, which gives, as expected, a neutral charge.

For years afterwards—despite the fact that not even their inventor was sure they really existed—physicists searched for the fractional charge of quarks with the diligence, said one, of "literary scholars searching for meaning in a passage of Joyce and with about the same result: nothing."

Searches in vain were made in cosmic rays, in meteorites, in moon rocks, in ocean-bottom mud. Oysters were at one time conjectured to be the world's best quark collectors. (The physicist in question didn't find any pearls, either.) Millikan's oil drop experiment was refined and repeated "ad nauseum." (When this very careful experimenter established "for once and for all that all charges in nature are equal to, or are multiples of, the elementary (and integral) charge of the electron," he observed that maybe he once saw a fractional charge. When quarks came into vogue, this observation was dug out of the turn-of-the-century literature.)

Then, in April 1977, three physicists (William Fairbank, Arthur Hebard, and George LaRue) reported in a post-deadline paper at the American Physical Society meeting, that they had seen not one, but two of these fractionally-charged "beasties." Their modern-day "oil drop" experiment used as its "oil drops" little balls of superconducting niobium, a metallic element. But since no other experimental group has ever been able to reproduce these results, they are tentatively dismissed as "just a case of spring fever." (Fairbank, LaRue, and a third colleague, James Phillips, also from Stanford University, have, however, "refined" the earlier niobium-drop experiment, and they report in *Physical Review Letters,* having seen two more fractional charges.)

On the basis of so much overwhelming negative evidence, most physicists concluded that "free" quarks simply don't exist in nature, ready to be harvested, and they set out to explain why not. But no one was willing to discard the quark model. It remained a picturesque and mathematically simple way of classifying the large number of observed elementary particles into a small number of

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families. And *indirect* evidence for quarks was accumulating. When very high energy electrons, for example, were scattered off protons, it was found that the protons behaved *as if* they were made of "swarms of much smaller objects."

The way Kenneth A. Johnson of the Massachusetts Institute of Technology, and others, solved "the puzzle of unseen quarks" was to propose that quarks are forevermore bound together in a finite region, or "bag." This model—which quickly became known as the "MIT Bag Model"—says the quarks can exert pressure on the bag, thereby inflating it (like a balloon), but the quarks can never pass through the fabric of the bag.

To understand what may keep quarks confined in, for example, a protonic or neutronic bag, we turn to the idea of "forces" in nature. It is the force of gravity which keeps our feet on the ground, and that of electromagnetism which binds together the atoms in our feet (so that these selfsame feet can be planted on the ground). Both these familiar forces in nature are long-ranged, and their strength falls off with increasing distance.

The strong force between quarks, which holds them in their "bag," is presumably *also* long-ranged. (Such a long-range quark force, once suggested Peter Carruthers, now Theoretical Division Leader at the Los Alamos Scientific Laboratory, could, when coupled to the electron world, be used to give a theoretical basis to phenomena such as extrasensory perception.) But this force is a peculiar one, for it can remain the same as the distance is increased. Or, it can increase. This explains why it seems so hard, if not impossible, to pry a quark out of its "bag" in, say, a proton. If the force increases with distance, so too does the

In Times To Come

● Six years ago next month, Gordon R. Dickson introduced the "Pilgrim" series, about an Earth and humanity enslaved by the Aalaag—a sinister race of aliens who viewed humans as "cattle" and wielded such power that resistance was unthinkable. But, humans being human, it could hardly remain unthinkable long. "Enter a Pilgrim" was a short story, hinting at a background so big and potential-laden that it whetted the appetite for more. Finally, more has arrived. Next month we lead off with Dickson's "The Cloak and the Staff," a new Pilgrim story—this time a novelette—wherein the seeds of rebellion planted six years ago begin to grow. And I'm pleased to report that John Schoenherr is back with the cover—his first for us in quite a while.

Milton Rothman's fact article, "Death Risk," takes a fresh look at this whole business of analyzing risks and comes up with some conclusions that may surprise you. Suppose, for example, you do something that *doubles everybody's* chances of dying in any given year. What do you think that does to the life expectancy? In view of the practical decisions we now must make, that kind of problem is no longer just an academic curiosity—and Rothman approaches it with a refreshing combination of mathematical rigor and easy readability.

We'll also have the conclusion of Dean Ing's *Anasazi*, plus whatever short stories we can squeeze in.

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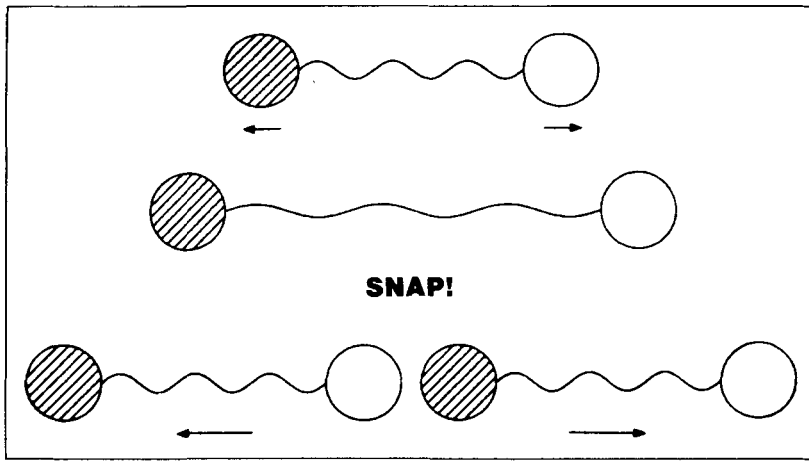

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Figure 3. A meson consists of quark (open circle) and an antiquark (shaded circle). Trying to separate them results not in free quarks, but production of yet another meson.

energy needed to pull any two quarks apart. To macroscopically separate two quarks would therefore require an enormous amount of energy. The "bag"—which also has mass, or energy, which is proportional to its volume—would have to be expanded to macroscopic—and impossible—dimensions.

This "infrared slavery," as it is called, allows quarks to break out of their imprisonment, but only in a funny kind of way. Suppose one tries to pull a quark out of one of the particles believed responsible for binding together the proton and neutron in the nucleus. Such a "meson," as it is called, is thought of as a quark-antiquark pair. One can pull a quark from it, as in Figure 3, only to the point where the energy put into the system equals the energy needed to create a new quark-antiquark pair. The pair then materializes, with its antiquark binding to the "freed" quark. The quark from the newly-created pair replaces the displaced quark in the meson. What we see here, then, is simply the creation of a second meson, a case of "the more things change, the more they remain the same."

A complementary principle suggests that at close range, the forces between quarks are weak, leading to freedom, of a sort. When one "looks" at quarks when they are very close to one another, they seem to behave as essentially independent particles. Indeed, behavior of this kind has been observed in high energy collisions of particles such as protons, with other particles. Over *very* short distances, then, the quarks are temporarily loosely bound, and this is known in the argot of physics as "asymptotic freedom." It is behavior such as this, which one ex-

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pects to find in superdense matter.

While the idea of quarks existing as entities inside protons and neutrons has been around since that memorable April Fool's Day, the nature of the forces acting between (and binding together) quarks has only recently been elucidated. And, it was not until something was known about the nature of this strong force—or "quantum chromodynamics"—that people could begin to think of its astrophysical implications. These were first discussed in *Physical Review Letters* in 1975 by a pair of scientists from the University of Cambridge, England, in a paper they called "Neutron Star: Neutrons or Asymptotically-Free Quarks?"

A neutron star, as an astrophysicist once quipped, is "an enigma" wrapped in a superfluid, wrapped in a solid crust, all topped off with a few meters of gas. If the "enigma," or core, is indeed quarks, the scenario might run like this. The various bags full of imprisoned quarks (the neutrons and protons of the collapsing massive star . . .) would be squeezed together when the density became sufficiently high. The boundaries of the bags would be blurred; the individual quarks would forget which protons, for example, they belonged to. Finally, at some point, when the densities (and/or temperatures) become still greater, the bags would all merge. At such a time, the quarks would be "asymptotically free": all would share the same quantum chromodynamical interaction—in one big bag!

The question is, would the lazy lady who is nature (and who always takes the easy way out) find it energetically easier to make a quark soup instead of a neutron solid? Gordon Baym and S.A. Chin of the University of Illinois, neither of whom, incidentally, believe in a quark core for a stable neutron star, nonetheless calculated that quarks would be the preferred transition at densities around 10 to 20 times that of nuclear matter densities—densities far above those in the "ordinary" neutron star.

Other astrophysicists have noted technical deficiencies in that paper and propose that quark matter is a viable option at twice nuclear densities, densities which clearly exist in neutron stars. *Wherever* the transition point, it is here that it would take less energy to allow the quarks their soup than to cage the neutrons in a regularly-arranged crystalline structure, or to form something even more exotic.

The Vela pulsar, it is now suggested by W.B. Fechner and P.C. Joss of MIT, might be a neutron star with a quark, rather than, as once thought, a solid core. PSR 0833-45 was first detected pulsing regularly at frequencies inside (and outside) the radio band more than a decade ago, in 1968, at the suspected site of a supernova remnant. At its discovery, this pulsar, the thirteenth ever, was found to be a bit different from its predecessors, exhibiting the shortest pulse—once every 0.89 seconds—ever measured. After a few months, its Australian discoverers were dismayed to learn that it "speeded up." Previous pulsars had—as theory

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said they ought—tended to slow down. The Vela pulsar then, confounding everyone further, slowed down again.

While it is now almost universally believed that pulsars are really rapidly rotating neutron stars, the inner mainsprings of these celestial clocks are not at all well understood. (The original theoretical arguments inevitably began with the question, "What else *could* pulsars be?") One early suggestion, based on the supposition that the Vela has a solid core, was that the sudden jumps in this pulsar's frequency might be accounted for by "starquakes." (Such starquakes were postulated in analogy to the earthquakes of a "geologically old" planet like our own.) That is, sudden releases of elastic energy stored in the solid neutron lattice could, some said, lead to sudden changes—or "glitches"—in the Vela's rotational speed.

If pulsar-crust should suddenly crack as a result of the accumulated strains produced by a starquake, the star's moment of inertia would be slightly reduced, and the pulsar would spin faster. This small change in the star's speed of rotation (necessary to conserve angular momentum) can be used to predict the readjustment in surface position. In the case of the Vela pulsar, the shift ought to be a hundredth of a centimeter, according to the calculations of Malvin Ruderman of Columbia University. But no one has so far been able to detect the effect of such a shift on the spin rate.

An alternative explanation, suggest Fechner and Joss, is that the "glitches" occur as some amount of superfluid neutron material turns into quark material. The nature of the core could not help but be radically altered, and this process might, in turn, lead to a "quark-quake" . . . and a "glitch."

If quarks do exist in the cores of neutron stars, what would this tell us about the nature and lives of neutron stars? M.B. Kislinger of the University of Chicago and P.D. Morley of Iowa State University have a model which predicts moderately high neutron star masses—2.34 solar masses—a somewhat larger radius than usual—15 kilometers—and a quark core which contains about 7 percent of those quarks known as "the strange ones." In this (slightly antiquated) model, the lightest quarks have masses about one-third that of a neutron or proton, and while *they* occur at nuclear densities, the "strange" (and heavier) quarks only appear in the denser core.

These two astrophysicists further suggest that the collapse of a massive star might—perhaps because of the pressure of the core quarks—cause a hydrodynamic "bounce." That is, the star would collapse, expand, and collapse again. In the process, the star would throw off overlying material to escape velocities, and this would lead to a supernova explosion. Or, in a second scenario, energy—as neutronlike quarks are converted into strange quarks—could be deposited in a shock wave, which then could lead to yet another kind of catastrophic explosion.

Following the supernova explosion, the stars might stabilize—perhaps as a

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result of quark degeneracy—and form, as in our diagram, a third class of stable ultradense stellar object. That is, somewhere out there may be *bare* "enigmas," true quark stars, without the wrappings of neutrons, crust, and gas.

Now, Fechner and Joss have also investigated this possibility, using modern-day quark models—consistent with all experimental nuclear and high-energy physics data—which assume quarks have a very low mass, or are massless. (Most of the mass of a bound system of quarks is now usually thought to be due to the energy of the entities that bind them together. Such particles are called, naturally enough, "gluons.") Fechner and Joss conclude that stable quark stars are "entirely possible" (though they do not discuss their formation). Fechner and Joss, moreover, caution that the macroscopic properties of quark and neutron stars need not be significantly different. That is, the two kinds of stars might have similar masses, surface redshifts, and moments of inertia. This leads to the speculation that *some* of the 100 million of the 100 billion stars in our galaxy that have collapsed may not be neutron stars, or even neutron stars with cores of quarks, but stars made only out of "quark cloth."

Not only may quark stars be masquerading as neutron stars, but some of the objects we have thought of as black holes may in reality be quark stars. From MIT comes the further speculation that Cygnus X-1 might "not be a black hole, but simply a bag of quarks." Kenneth Brecher and G. Caporaso argue that the arguments used to support the claim that this X-ray emitting source is a black hole require too many assumptions: that Cygnus X-1 is a binary rather than a triple star system; that an X-ray source is powered by accretion from a companion star; that general relativity is correct beyond its tested domain. . . .

Moreover, these two astrophysicists say, these arguments depend most crucially on the existence and value of an upper mass limit for a star with a density of some 10^{15} grams per cubic centimeter. If the dying star was "obese" when it began to collapse (with a mass equivalent to about three solar masses), then the partially collapsed "quark" object *could* now be stable—and the X-ray emitter known as Cygnus X-1.

It may, in fact, turn out to be a case of having "to encircle the truth by elimination." Since the upper mass limit of neutron stars depends critically on how one describes supernuclear densities, finding a star whose mass is greater than that theoretically predicted would tell us current ideas about supernuclear densities are wrong. For example, knowledge of the masses of several neutron stars in binary systems already has helped astrophysicists rule out the possibility that matter at such high densities consists of noninteracting free neutrons. Finding a star, therefore, with mass greater than about three solar masses would, in analogy, indicate that high-density matter is acting radically different than once expected—and, that

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perhaps, general relativity is not, after all, the correct theory of gravity. (Stable quark star masses as high as 5 solar masses have been predicted.)

Further progress in distinguishing among the suggested possibilities might, suggests Brecher, come from gravitational redshift measurements. Sorting out the possibilities thus depends on making careful observations of spectral lines in the X-rays and gamma rays radiated by this star. For these spectral lines to be detected at all, they would have to have "relatively narrow" widths. Determinations of the redshift, along with a mass determination for a neutron star in a binary system, says Brecher, might allow a distinction to be made for that star. Estimates of the production rate for these lines vary. Nonetheless, a flux from a quark star is expected to be comparable to that from known binary X-ray sources. For example, the Hercules X-1 source has been observed by the High Energy Astronomy Observatory X-ray telescope. This telescope began, from its satellite home, in late 1978, to return the first images ever of X-ray sources in space.

In the meantime, quarks may have yet other implications for the stars, this time involving black holes and *their* extinction. Stephen Hawking points out that the final state of a black hole, involving its evaporation into particles and antiparticles, would proceed so rapidly that it too would end in a tremendous explosion. How powerful this explosion would be depends directly, Hawking points out, on how many different kinds of elementary particles there are. A case of "the more, the merrier," because the more elementary particles, the more powerful the bang. Thus, while elementary particle physicists find it frustrating that there is "a quark population explosion," some astrophysicists do not share in their frustration.

Originally, Gell-Mann proposed there were three quarks. Later discoveries required a fourth and a fifth to be "tacked on" to the model, which, for theoretical reasons, seems now to need a sixth. This brings us to a total of 12 (for each quark, of course, comes with its antimatter analog). With 12 different kinds of quarks, the final explosion of a black hole about the size of the proton would be equivalent to setting off 10 million one-megaton hydrogen bombs. This is rather like the primordial explosion with which our universe began, but on a rather smaller scale. Multiply the quark population sufficiently, and one wonders if we really live in a "Big Bang" universe, or . . . in a "Big Bag" universe. ■

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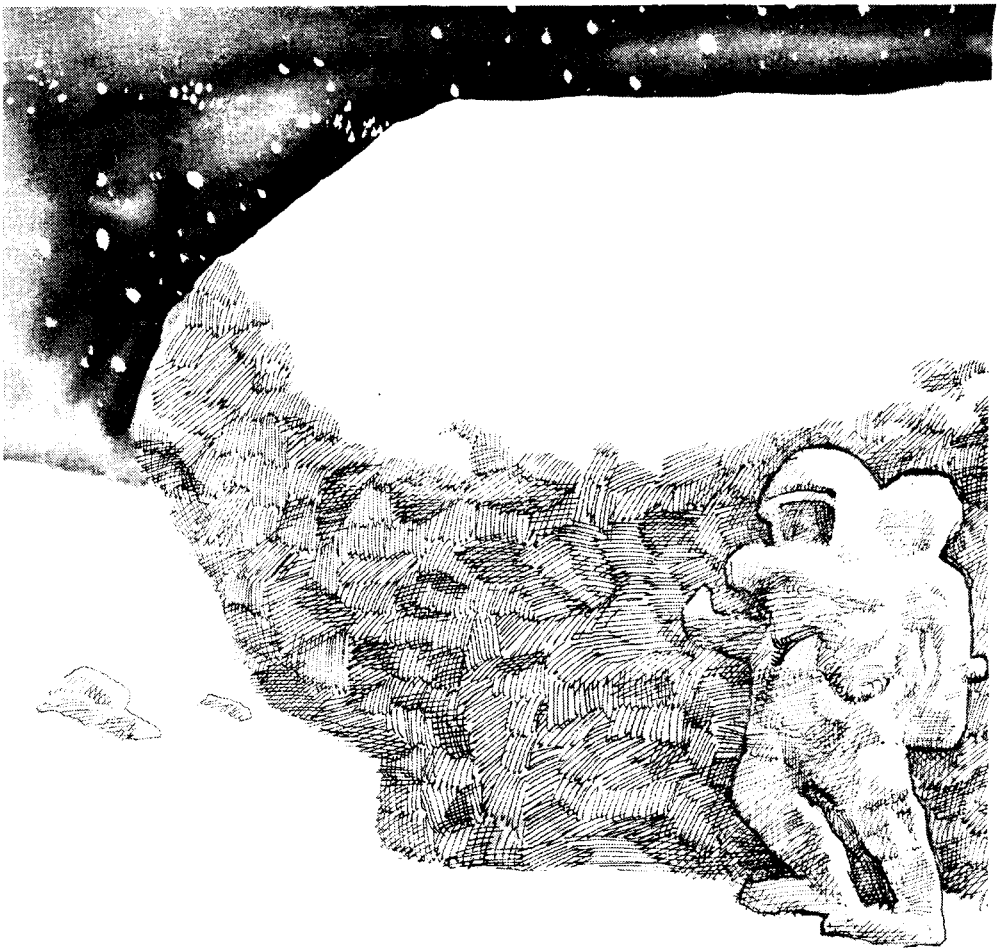

by TIMOTHY ZAHN

A new form of communication worked when nothing else would—but only under circumstances that guaranteed a most unfavorable signal-to-noise ratio.

The Dreamsender

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It was always a great day for me when my tiny office was graced by the presence of a paying client, so when I got two jobs in the same day it was cause for a quiet celebration. Riding up the thirty floors between my office and apartment I decided to splurge and cook myself the steak I'd tucked away in the freezer for a special occasion. It was a shame I couldn't have a bottle of wine with it as well, but that was one of the ironies of this job: the only times I could afford to buy good liquor I couldn't afford to drink it. I learned long ago what alcohol did to my performance.

I had just finished changing into more comfortable clothes and was hunting for that steak when the door-

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bell buzzed. Frowning a bit—I wasn't expecting anyone—I glanced through the peephole. The woman I saw was short, dark, rather plain-looking, and a complete stranger to me. I opened the door.

"Mr. Jefferson Morgan?" she asked without preamble. "The Dream-sender?"

"Yes," I admitted. "What can I do for you, Miss, ah—"

"May I come in?" I stood aside and she brushed past me, moving quickly as if afraid someone would happen by and see her here. I motioned her toward the couch and closed the door.

"My name is Louise Holst," she said as we sat down. "Please forgive me for bothering you at home like this, but I was afraid to come to your office. I didn't want your secretary to hear what I have to tell you."

"As it happens, Miss—ah, Mrs. Holst," I amended, noticing her rings for the first time, "I don't have a secretary. I prefer to meet my clients personally." *I didn't add that I* couldn't afford a secretary even if I'd wanted one. "What seems to be the trouble?"

She took a deep breath. "Let me start at the beginning. My husband, Captain Lawrence Holst, is in the middle of a six-month tour of duty at the army's base in Krieger Crater, on the moon. The day before yesterday was our anniversary, and he had promised he would call me then. He's never broken a promise like that before, so I waited until this morning and then called him. Or, rather, I tried to. The operator at Krieger said he couldn't put me through to Larry, that he was off the base for a few weeks on special duty. When I asked what kind of duty, he got vague and mumbled something about surface mining operations."

I shrugged. "They do a lot of that at Krieger, or so I hear. Lots of heavy metals up there."

"Yes, but Larry isn't a miner. He's in the Signal Corps. But the thing that really worries me is this. I'm afraid I made something of a scene over the phone, ending up almost threatening to call every hour until he got in. About a half hour later someone else—a lieutenant colonel, I think—called me back. He said he was in charge of Larry's expedition and that they were patching him through from some Farside mining area. He told me that Larry was okay and that I should stop worrying, that they would be back at Krieger in a month or so and Larry could call me then."

"*And you don't believe him?*" That much was obvious.

"No. He sounded—well, *stiff*, as if he was watching every word. And he sounded worried and tense. *And* that was no patch; I've talked over those before, and the reception is terrible. This wasn't like that."

She ran out of words, or breath, or both. I said, "So you think something is wrong with your husband? What?"

"That's what I want you to find out. I'd like to hire you to—to contact him tonight."

Much as I wanted another job, I

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knew I had to be honest with her. "Mrs. Holst, I'm afraid you have a slight misconception of just what a Dreamsender can do. Basically, dreamsending is—"

"I know all that," she interrupted my standard lecture. "Dreamsending is a limited form of telepathy where the sender appears in a dream of the recipient and delivers a short message. But surely the communication is two-way, isn't it?"

"Of course, but how do I know whether what I'm seeing is truth or fiction?" She looked rather blank, so I went on, "Look, from all I've ever been able to tell, dreams are largely made up of random bits from the memory, perhaps focusing on some current problem or wish. People aren't trained to—well, to *think* in a dream. Sure, I can tell whether a person I've contacted has gotten the message, and usually whether he really believes that I wasn't just a normal dream. But that's more of an emotional response than a rational one. If I asked a specific question I wouldn't have any idea how much of the answer I could believe. If any of it."

She was silent for a long minute. "I'd like you to try anyway," she said at last. "If you will."

I shrugged. "I'd be happy to."

She reached into her purse and withdrew a photo and an envelope. "Here's your hundred-dollar fee, and this is a picture of Larry."

Captain Holst was young and serious-looking, with wavy hair and large ears. "May I keep this for tonight? I may have to refer to it again later."

"Certainly." She stood up, looking maybe a shade less worried. "When can I find out the results?"

"Come in any time tomorrow or phone. You know where my office is?"

"Yes. But so soon? What if you can't catch Larry in one of his dreaming stages tonight?"

"I don't have to. As long as he's asleep he'll start dreaming when I contact him."

"Oh. Then I'll be in tomorrow, Mr. Morgan. Good night, and thank you."

She left, and I tossed my steak into the micro to cook. Then I sprawled on the couch and mulled over my new job. I had no doubt myself that there was nothing seriously wrong with Holst, though it might be a problem convincing his wife of that. But at least it made a change from my usual missing persons or runaway assignments. I picked up Holst's picture and studied it. The unique advantage of dreamsending over other communications was that the Dreamsender didn't need anything but the recipient's name and a fairly recent picture of him. Approximate location was useful, but by no means necessary, and even a wrong location didn't seem to hurt too much. No one knew why; but then again, no one had the slightest idea how *any* aspect of dreamsending worked. Even though I was having trouble making a living with my talent, it gave me a certain kick to know how thoroughly a score of Dreamsenders were confounding the entire scientific community.

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In the kitchen the micro pinged. Tossing the photo onto the couch, I headed for the kitchen, feeling better than I had in weeks. Three clients in one day! Maybe this business was finally going to start paying off.

Joanna Smith was dreaming about an apartment that was somehow attached to—and a part of—an elevator. Only one of the other people in the elevator had a distinct face; probably one of her real-life friends, I decided. Stepping up to Joanna, I said, "Miss Smith?"

"Yes?"

"My name is Jefferson Morgan. I'm a Dreamsender in New York. I have a message for you from your parents."

There's always an emotional tremor as the recipient realizes this isn't the way dreams normally go. Joanna decided to be scared, and she started running. But people don't really go anywhere in dreams and I had no trouble staying alongside her as the scenery flew past us. "Don't be afraid, Miss Smith. I won't hurt you, but I have a very important message to give you."

Curiosity was beginning to overcome her fear. I waited, knowing better than to try and deliver my message before she was ready to hear it. Finally she gave in. "What is it?"

"Your Uncle Glenn has had a stroke. The doctors aren't sure whether he'll live or not. Your parents knew you would want to see him, but you didn't leave an itinerary for your camping trip and they couldn't find you."

She was wavering now, unsure whether to believe me or to defend herself against emotional shock by declaring this dream to be an ordinary nightmare. Images, emotional bursts, and random words were starting to pop up all over the place. "Please believe me," I said quickly. "Your uncle very much wants to see you. Call your parents to confirm this message or, if you prefer, call the toll-free Dreamsenders number in the phone book. I won't even be offended if you want to consider this some sort of occult clairvoyance—which it isn't—and me some figment of your imagination—which I'm not. But *do* believe my message. Your parents paid a great deal of money for it and I would hate to see that money wasted."

It was a long speech for a dreaming person to hear, but it did the trick. She was finally convinced. I said good-bye and broke the contact, knowing that as I did so she would wake up.

I awoke myself with the slightly disoriented feeling that I always get after sending a dream. Turning on my bedside light, I blinked at the ceiling for a minute, and then reached to the nightstand for Larry Holst's picture. Two down, one to go. As I marshaled my thoughts concerning this message, it occurred to me that I was about to make Dreamsender history: to the best of my knowledge no one had ever before tried dreamsending to the moon. Maybe I would rate a footnote in a history book someday. Snapping off the light, I rolled over and went back to sleep.

Sometime—probably about an hour

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later—I was in the half-conscious, half-dreaming state that I need to make a contact. With a slight effort I formed an image of Captain Holst in my mind. Slowly, an unfamiliar scene appeared around me, and from a mist at the edge of my vision a figure emerged. It was Larry Holst.

I moved toward him with a strange buoyancy I'd never felt before, almost as if I were myself in the moon's lower gravity. "Captain Holst?" I said. "My name is Jefferson Morgan—"

"It won't work," he interrupted wildly. "He can't get away with it."

"Sir, I'm here to help you," I said. "I'm Jefferson Morgan, a Dreamsender."

Images were flashing by, and I realized he wasn't really paying any attention to me. I opened my mouth to try again, then thought better of it. Maybe he would settle down in a few minutes; surely he couldn't maintain this emotional level for long. Meanwhile, I'd watch his dream images and try to figure out why he was so upset.

It was something like trying to simultaneously watch five movies, all of which are on high-speed settings. Pictures popped up all over the place, sometimes out of nowhere, sometimes generated by preceding thoughts. Often a given image would start its own series, as well. Some of the images and thoughts were familiar—a series of craters, for example: Tycho, Krieger, Mairan, Foucault, Aristoteles, and more—while others I could only guess at. Circuit diagrams, sunlit lunar landscapes, scenes that must have been from science fiction movies—all of it snarling together into an absolute mess of image, sound, and emotional coloring.

Enough was enough. This wasn't getting me anywhere. "Captain Holst!" I shouted over the din. "You must listen to me. Your wife is worried about you."

Everything slowed down as he realized I was still there. "Who are you?"

"I'm Jefferson Morgan, a Dreamsender. Your wife asked me to contact you, to see if you were all right."

Holst's emotional tremor was much gentler than Joanna Smith's had been. Maybe the idea of receiving a dream didn't scare him much, or maybe he was just running out of emotional energy. "Where are you, sir? Are you all right?" I asked when he was listening again.

"Krieger D barracks," he said and suddenly there were bars around us.

"Are you in jail there?" I asked, startled by the image.

"All of us were sequestered by the Colonel." I got a pieture of Holst tinkering with a machine—circuit diagrams flashed again—near something that looked like surface-mining equipment. Several other men appeared nearby, and the cage around us expanded to include them.

"A mine?" I guessed, trying to make sense out of the images that were going by. "Where? What kind?"

"New one, north. Iridium vein, very rich."

"And you were all sequestered? Why?"

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His answer, if he gave one, was lost in a new explosion of pictures: more movielike scenes in the background, while nearby a colonel was struggling to stuff something into a sack. A group of snakes appeared and Holst began to argue with them for permission to reassure his wife. Thoughts of her seemed to agitate him; the bars around us turned thicker and darker, and again his dream began to resemble a high-speed kaleidoscope. For the first time in my experience I felt myself being caught up in the emotional current. "I'll talk to you later. Goodbye," I said hurriedly and broke the contact.

I woke up covered with sweat. Rolling out of bed, I went into the kitchen to make myself some hot chocolate. Never before had a contact hit me that hard. I still didn't know what was going on up at Krieger, but *something* sure as taxes was worrying the stuffing out of Captain Lawrence Holst.

It was another two hours before I felt calm enough to go back to sleep. I spent most of that time going over that last contact, trying to recall as much detail as possible, and as I did so several elements of the dream began to stand out. The imagery was going to be tricky, though, and before trying to decipher it I decided to wait until I could consult with the local expert on Larry Holst's mind.

Louise Holst was at my office door at nine sharp. I sat her down, gave her a cup of coffee, and took a seat across from her. She was obviously eager for my report, but had the self-control to wait until we were settled.

"Did you contact my husband last night, Mr. Morgan?" she asked.

"Yes, I did." I hesitated. "I'm afraid your suspicions were correct. Something is definitely going on up there. Nothing obviously harmful to your husband," I added, seeing her stricken look.

"Then what is it?"

I shook my head. "I don't know for sure. There were a lot of images in his dream that made no sense at all to me. I hoped you could help me interpret them."

I proceeded to describe the contact to her. She asked occasional questions, but generally listened quietly to my account.

"I wish I could help you," she said when I had finished, "but I don't understand most of those symbols myself. All I can suggest is that Larry often refers to sneaky people as 'snakes.' I guess I don't know him as well as I thought I did."

"Don't let it worry you. I doubt that he understands much of his dream imagery himself," I told her. "I've been thinking about your husband's dream, Mrs. Holst, and I think I can take at least a stab at what he was trying to say. The outstanding elements are the new iridium mine, his own presence there, and the sequestering of everyone there by the colonel. Do you know this colonel, by the way?"

She nodded quickly. "Colonel Avram Stark is the commander of Krieger Base. He reports directly to

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Jay Kay Klein's

BIOLOG

Dean Ing

Some writers are cast in the mold of desk-bound intellectuals daydreaming over a typewriter. Dean Ing is in the Hemingway tradition of personal, physical encounters with man and nature. Born and raised in Texas, he has spent many vacations in the Rockies, often on solo backpacking trips using survival gear of his own design.

He still drives the Magnum GT coupé he developed more than twenty years ago and which was featured at a major auto show and in an auto magazine. Now his competitive interests center on alternative-powered racing vehicles using wind, muscle-power, and other exotic fuels.

Dean's first published story appeared in the February, 1955 issue of this magazine, exactly five years before the name changed to present-day Analog. "Tight Squeeze" was science fiction then, but now reads like a factual account of a routine, if possibly deadly, problem on an early space flight. Showing here are some of his past occupations as USAF interceptor crew-chief, aerospace proposal writer, heavy construction worker, and senior research engineer.

He picked up a B.A. degree in speech, radio, and TV, then an M.A. and Ph.D. in speech and communication theory at the University of Oregon. He followed this up with Amerind studies, aerospace design engineering, and racing car design.

After three years as an assistant professor at a Midwest university whose nineteenth century atmosphere he found repressive, Dean moved to Eugene, Oregon to write full time. Helping ease the shock of irregular income was his wife's income as a radio and TV newsperson. The eldest of four daughters is now an actress working for breaks in Hollywood.

Published last summer is a science fiction novel, Soft Targets. In progress is a novel about World War IV.

General Blaine at the Pentagon."

"So Stark is completely in charge on the moon, eh?" I drummed my fingers on the chair arm. "Can you think of any reason he'd lock up everyone who had been at a new mine?"

"A bad accident, maybe? Something they didn't want publicity about?"

"I wonder. Stark was trying to put something in a sack in your husband's dream. Do you happen to know if he gets a percentage or bonus on new mineral wealth?"

She looked astonished. "In the *army*?"

"I didn't think so. This is a wild idea, but do you suppose Stark is trying to take the iridium in that mine for himself?"

"How would he get it off the moon?"

"I haven't the foggiest. I've never given much thought to interplanetary smuggling. I imagine it's possible,

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though." We both considered this.

"If you're right," she said slowly, "then Larry is in real danger. Stark couldn't let word of the mine leak out, and he can't hold those men forever. He'd have to—to kill them." She turned suddenly widened eyes on me. "You have to help me, Mr. Morgan."

"How? I doubt if I can get any more information than I already have from here."

"You could go to the moon and get proof. You could get it to the newsmen, or the Pentagon, or someone—"

"Just a second, Mrs. Holst. I'm afraid you've got the wrong guy for this job. First of all, I can't get to the moon—I haven't got the money for a commercial flight and there's an eight-month waiting list, anyway. Secondly, this isn't my field. You'd be better off hiring a private eye. And thirdly, our theory may be completely wrong, and if it is I'd be sticking my nose deeply into army business, a practice the Pentagon takes a very dim view of. I'm a Dreamsender, not a professional kamikaze. I've done my part here."

She looked at me with an expression that was scared, tired, and cold, all at once. "All right, Mr. Morgan. Thank you for your help in contacting my husband. I'll do the rest alone."

"How?"

"I have a military pass that entitles me to get an immediate seat on a commercial lunar flight. I think our savings can cover a round-trip ticket." She stood up. "I'll get to Larry somehow."

"Sit down, Louise." She did so, not batting an eye at my use of her first name, and waited. I stared out the window for a half minute or so, wishing I weren't so soft-headed. But I had little choice. It was a cinch she could never get close enough to find out anything—she was probably known on the base and Stark knew she had tried to talk to her husband. He'd be watching for her to show up. And if he *was* up to something illegal, he might decide that he couldn't let her live, either. She'd just be saving him the trouble of coming down here and getting her. "All right, Louise. *If* you can pay for the ticket and *if* we can figure out a way to get me aboard a flight with your pass, I'll take a crack at it."

She didn't throw her arms around me or roll her eyes heavenward or do any of the standard grade-B things. She just sat there with melting eyes and said, "Thank you, Mr. Morgan."

"Call me Jeff," I said. "Let's get to work."

Besides, I'd always wanted to visit the moon.

"Last call, Flight 126 for Collins Space Station and Prinz Crater, Luna."

That was my cue. Picking up my carry-on bag, I trotted around a corner and went to the check-in desk. "Larry Holst," I told the man, handing him the ticket Louise had purchased a few hours previously with her priority pass. I hoped he wouldn't look carefully at it.

He did. "Uh, sir? This ticket is made out to *Ms.* L. Holst."

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I craned my neck to look. "You're right," I agreed with what I hoped was the proper touch of amused surprise in my voice. "I never even noticed."

"I'm sorry, but I'll have to see some identification, sir."

"Sure." This was the touchy part, but Louise and I had planned for this and if I'd timed it correctly it should work. Pulling out a thick wallet, I began rummaging through it. Tossing a couple of Larry Holst's credit cards on the desk, I commented, "My driver's license is in here somewhere."

The clerk glanced at the name on the credit cards, then at his watch. "Never mind, Mr. Holst, this will do. You'll have to hurry now, they'll be sealing the ship in two minutes. Right through that door there, sir, and have a good flight."

I made it with a minute to spare and sank into my seat thankfully. So far, so good, and for the next few days I was in the clear. Louise had given me the code numbers that went with Larry's credit cards, so I could charge my room and meals on Collins without raising any suspicions anywhere. But Collins and Prinz Crater were purely civilian stations, after all, and as long as I wasn't using stolen cards no one really cared whether I was Larry Holst or not. The real problem would be trying to get in touch with Larry at Krieger without getting caught.

Well, one crisis at a time. Right now I needed to give my attention to the stewardess as she explained how to use the emergency oxygen masks. Fastening my seat belts. I decided to sit back and try to make myself relax.

Prinz Crater, located at the south of the Harbinger Mountain range, was fairly unusual in that it was only a partial crater, its rim forming a semicircle that opened to the south. The colony had been built just outside the crater, nestled into the shadow of the northern rim, and consisted of a half-dozen domed buildings connected by underground passages. My room at the Prinz Hilton seemed rather Spartan—especially considering the price—but a careful look at the clientele suggested that luxury would have been wasted anyway. Prinz seemed to be the major spaceport for both civilian traffic to Krieger Base and scientific parties bound for the diggings in the Schroter's Valley region, and I doubted whether either group cared much what the Hilton's rooms looked like. Ordinary tourists seemed a little scarce, but there were enough around to keep me from feeling too conspicuous.

I spent my first day on the moon in and near the hotel, learning about the spacesuits and other rental gear, and studying maps of the region. After dinner that evening I discovered that the Hilton had a colorful pamphlet on lunar history. Taking a copy back to my room, I sprawled across the bed and read it through carefully. Of special interest was a section on the army's military bases, a section that included a sketch of the nonclassified areas of Krieger Base. Krieger "D" barracks, Larry had said; only there was no "D" barracks listed on the map.

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I stared at the page for several minutes, pondering this unexpected problem. Louise and I had worked out a way for me to get in touch with Larry, but I needed to know at least approximately where he was being kept. Obviously, I had misread the information during that first confused contact; just as obviously, there was nothing for me to do except try it again. I wasn't crazy about the idea, but it was that or catch a flight back to Earth. Besides, he was bound to have calmed down somewhat by now.

My first attempt that night failed—Larry was apparently not yet asleep—but I made it on the second try. The scenery around Larry this time seemed relatively quiet, though there were rumblings like thunder in the distance. "Captain Holst?" I called. "This is Jefferson Morgan again."

He turned from the circuit he had been working on and faced me. "What do you want?"

"I'm here to help you," I told him, trying to ignore the unfriendly look he was giving me. "Where are you?"

"Special Duty Barracks, Krieger D. Why are you here?"

"Your wife asked me to help you, remember? She—"

"You leave Louise out of this!" he shouted, unfriendliness turning to outright hostility in an instant. The whole dream reflected the change; thunder crashed nearby and a strong wind began to blow. Louise appeared to one side and Larry sprang over to stand between us. Protecting her from me? "Go away!" he yelled, shaking his fists at me. "Leave me alone, do you hear? Leave both of us alone!"

"Okay, okay, I'm leaving," I said. Struck by a thought, I added, "Don't worry, Stark won't hear about this from me."

That got me a reaction, all right, but it was so fast and multifaceted that I couldn't read anything at all from it. I gave up and broke the contact.

I lay in bed for a few minutes afterwards, thinking about what I'd seen and felt. At least I now knew where he was, more or less: not Krieger "D" barracks but a barracks in Krieger D. The latter, I remembered from the maps, was a small crater about twenty kilometers from the main base. It was only about three kilometers across, so I should have no trouble finding the barracks itself.

And I *was* going to find it. Larry had been angry, hostile, and threatening, but behind all of that I had been able to sense another emotion: fear. Larry Holst was still afraid of something, and more than ever I wanted to know what. I had undertaken this job mainly from a lopsided sense of duty, but my own native curiosity was starting to take a keen interest in things.

There was still one chore to do before I could close shop for the night. I contacted Louise, assured her Larry was all right, and told her I would try to contact him directly the next afternoon. It still bothered my scientific intuition that dreamsending from the moon felt no different than if Louise was across the street, but I had too many other things on my mind to

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worry about it. Later, maybe, when all this was over, I'd write a letter to some journal somewhere. For the moment, I was just glad that this time all I had to do was *send* information, and not try to receive any.

Finally, message complete, I set the alarm for seven o'clock and settled down for a good night's sleep. Tomorrow was going to be a busy day.

"Good morning," I said briskly to the clerk at the rental counter. "I'd like to check out a suit and buggy for the day."

"For a long trip, sir?"

"Probably. I want to go exploring a little around the Aristarchus Rille area. Pick up some rocks, get a few pictures; that sort of thing."

He consulted his list, confirmed I'd been checked out on the equipment yesterday by one of the staff. "I can let you have one of the Selenes, Mr. Holst; number eight. Is that satisfactory?"

"Fine." The solar-augmented batteries of a Selene, I had been told, gave the buggy an almost unlimited range. Even with the decoy run I would have to make, the round trip to Krieger should be easily less than three hundred kilometers.

The suit and Selene were delivered in ten minutes, one of the hotel staff then taking another thirty to help me double-check everything, but within an hour I was tooling northwest along the sun-lit lunar landscape at the rip-roaring speed of forty kilometers an hour. The terrain was pretty hilly for a while, until I had crossed Prinz Rille I, but then it generally settled down, and I was able to devote less of my already busy mind to the chore of driving.

It took me a bit over an hour to reach Aristarchus Rille V. Finding a close-set pair of hills, I parked the Selene between them and set to work with the buggy's tool kit. What I was doing now was not only illegal but was the act of a suicidal idiot as well, and I could feel sweat gathering on my forehead. Carefully removing the self-contained radio beacon from its hiding place under the seat, I took it outside and left it beside a recognizable rock formation. The beacon was, naturally, designed so that it couldn't be turned off and was continually monitored from Prinz. To those observers, I would simply have left my vehicle parked while I went exploring on foot, and my side trip north to Krieger would go completely unnoticed. But, by the same token, if something happened to me, I couldn't be found by a rescue team. That one I tried not to think about.

It was only another fifty kilometers to Krieger D, but I took the time to give the entire Krieger crater system a wide berth. Swinging east, I circled Krieger D at a distance of about ten kilometers and made my cautious approach from the northeast. I reached the rim without incident and, after parking the Selene in a convenient depression, I began setting up my apparatus.

Among its equipment the Selene carried a very fine tripod-mounted monocular adapted for spacesuit use.

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Setting this up, I scanned the shadows at the south end of the crater, the likeliest place for the barracks to be. I wasn't disappointed. There it was, a squat building with a row of porthole-type windows near the ground, looking sort of like a cross between a cliff dwelling and a Quonset hut. Jumping the monocular's power, I took a look through all the windows I could see from my position, hoping fervently Larry was in an outside room. If he wasn't, the plan Louise and I had cooked up would be useless. But again I was lucky: neatly framed in the third porthole from the end was Larry Holst, writing busily at a foldaway desk.

So far, so good. Now came the hard part. I obviously couldn't use a radio to contact him, even if he had a transceiver, which I doubted. No sentries were in sight, but there had to be *some* security measures in force around the building, so going up and knocking on Larry's window was out, too.

However....

A few years ago the number of scientific parties poking around remote areas of the moon had grown so great that some method of good communication had become essential. A series of satellites had been the answer, satellites that would accept modulated laser beam signals from the surface and relay such messages to a central switching station. Austere though the Hilton's rooms had been, the management knew better than to scrimp on safety equipment, and my Selene was equipped with a beautiful laser transmitter. It would make a bright red spot on Larry's wall, a spot I could flick on and off in Morse code. Larry should be able to come up with something to make his own dots and dashes with, and with the monocular I would be able to see whatever he used.

I was just about to go get the laser when a motion in the room caught my eye. Another soldier had entered and was talking with Larry. The conversation was brief, though. Larry stood up and disappeared from my view; he returned a moment later buckling a gun belt around his waist. Then, together, they left the room.

I thought about that for all of three seconds. Then I got up, stowed the monocular, and took off just as fast as the Selene would take me. Granted all I don't know about military procedure, I *do* know prisoners are *not* issued weapons. Larry was very clearly no longer a prisoner, and the obvious conclusion followed immediately: he had thrown in with Colonel Stark.

The trip back to Prinz was uneventful, which was a good thing as I wasn't paying much attention to my driving. Over and over again I shuffled the facts, lined them up, and added them together, and each time I came up with the same answer. Somehow Stark had gotten to Larry, either through bribes or threats—the latter, perhaps, directed at Louise. That would explain Larry's protectiveness toward her last night, as well as the fear I had sensed. If Stark got caught now, Larry would be run through the percolator along with the colonel, and he knew it. No

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wonder he had tried to throw me out of his dream.

For me, it all boiled down to the fact that my sole information source had dried up. I had counted heavily on a direct contact with Larry, on the solid data that he would have provided; without it I was effectively stalemated.

I lost an extra hour getting home by nearly forgetting to go back for the radio beacon I'd left at Aristarchus Rille V. I finally made it in around seven-thirty, itching all over from eleven hours in a spacesuit. First on my priority list was a bath, after which I had a late dinner. Returning then to my room, I stood in front of the porthole and glowered at the landscape.

There had to be a way to figure out what was going on at Krieger D. I couldn't go back to Louise and tell her she'd used half of her savings to send me to the moon for nothing. Larry might not yet be in so deeply that he couldn't be saved, especially if Stark was using threats to keep him in line. The right facts in the right hands might do it, but I needed facts first.

The really aggravating thing was that, down deep, I knew everything I needed had been in that first confused contact with Larry. I still remembered most of the images and words from that dream, but a good ninety percent of them had to be extraneous, and there was no way for me to separate the facts from the garbage.

Unless....

Unless I could correlate Larry's dream images with someone else's, someone who also knew what was going on. I leaped over to my nightstand —very literally; I'd forgotten about lunar gravity—and picked up the pamphlet I'd studied earlier, turning to the first page of the military history section. Sure enough, right below the picture of General Conrad Blaine was a photo of Colonel Avram Stark. I took the time to memorize both faces, even though I just needed Stark's at the moment. Blaine, as Pentagon honcho in charge of the moon, would be the man to contact once I had some facts.

With one last look at Stark's photo, I snapped off the light and slid into bed.

The overall tone of Stark's dream was a curious mixture of anxiety, frantic activity, and icy calmness. I stayed near the edge of the scenery for several minutes, watching for anything that looked familiar, but either Stark didn't use any of the same symbols as Larry or else he just wasn't dreaming about the mine tonight.

Perhaps a nudge would help. "Colonel," I called, "where are you?"

Stark turned at the sound of my voice as a burst of symbols, including several sets of latitude and longitude, went by too fast to catch completely. Two words—Krieger and Mairan—were visible for just a second. Between the two craters? Or was one name superfluous? I gambled and tried one more question. "Where is your iridium mine?"

"Forty, due east," he said, his eyes boring into mine with an intensity I didn't at all care for. I was just think-

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ing about making a graceful exit when all hell broke loose.

"You're a Dreamsender!" Stark shouted as weapons appeared beside him and began blasting ineffectually at me. "How much do you know, damn you? Who else have you told?"

I should have stayed and tried to bluff my way out, to convince him I was only a dream image. But I panicked. I backed away and got out of there, knowing even as I did so that he would wake up with a vivid memory of the dream.

But at least I now had some idea where the iridium mine was. The name of Mairan Crater, some four hundred twenty kilometers north of Krieger, had showed up in both Larry's and Stark's dreams, in the latter case as an answer to a direct question. "Forty, due east," Stark had said: forty kilometers east of Mairan? Larry had said the mine was "north," which would be approximately the right direction from Krieger D.

It was finally time, I decided, for me to blow the whistle. Stark's violent reaction, combined with Larry's earlier comment that "he can't get away with it," left me no further doubt that something illegal was going on at that mine. Admittedly, nothing I had so far could be considered hard evidence, but I should at least be able to spark an investigation by the Pentagon. And the sooner I started, the better.

Rolling over, I went back to sleep. An hour or so later I stepped through a misty barrier and came within sight of General Conrad Blaine himself.

His dream seemed to be a replay of some military crisis from his past. Shells and rockets whizzed about us, and he was dressed in full combat garb. I made my way toward him easily, but somewhere in the back of my mind something felt wrong, and for a moment I hesitated. Something in the scene around me? I couldn't tell. Nuts to it, though. I had a job to do.

"General Blaine? I'm Jefferson Morgan, a Dreamsender. I'm speaking to you from the moon with an urgent message."

Blaine's emotional tremor nearly knocked me off the map. I hung on and waited for it to subside before continuing. "There is something going on at your Krieger Crater Base that you should know about. Colonel Stark is up to something regarding a secret iridium mine near Mairan Crater—"

Blaine had been settling down, but the mention of Mairan set him off again. I waited for the emotional swirl to die down, but more than ever I felt something was wrong with this contact.

"Who are you?" Blaine asked. "How do you know this?"

"My name is Jefferson Morgan. I've been in contact with Captain Lawrence Holst, one of Stark's men at Krieger Base."

"What did he tell you?" Blaine took a step toward me, bouncing slightly.

Bouncing? *Bouncing?*

My thoughts froze in mid-sentence as the reason for my uneasiness hit me

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like a sledge hammer. I felt *light* —the same feeling I'd had when sending dreams to Larry, but *not* when I'd contacted Louise, even when I myself was here. It was a feeling that seemed to go with the recipient's location.

General Blaine was here on the moon.

I didn't even bother to say goodbye, but broke the contact just as fast as I could, and was pulling on my clothes almost before I was completely awake. Blaine on the moon and reacting violently to the name of Mairan could mean only one thing: he was in this thing with Stark, in it up to his neck. And speaking of necks, mine was now in serious trouble. I'd given Blaine both my name and Larry's and told him I was on the moon, and it would be trivial for him to track me down. I had to get out of here, and fast, or I would end up in the Krieger Base stockade. Or worse.

I needed a new plan of action, and one possibility began to take shape in my mind as I finished dressing. I would have to go to the mine now and get hard, photographic evidence of the plot. Once I had that, I could hole up somewhere and send dreams to every reporter and government official I could find. Lunar spacesuits were designed for long-term use, I knew, and with a Selene's supply of emergency oxygen tanks I could survive for a week or so away from civilization, long enough for someone to check on my story and blow the whistle on Stark and Blaine. I would have the photos to exchange for a government guarantee of safe-conduct back to Earth. It wasn't the best plan in the world, but it was all I could come up with. Whatever I did, I at least had the considerable advantage that no one could cut off my communication with the outside world.

Taking my camera and a few other things, I headed for the Hilton's lobby and rental counter, forcing myself to walk casually. This was no time to look like a fugitive. Blaine couldn't have gotten the word out this fast.

"I'd like to take a Selene out for a few hours," I said through dry lips.

The clerk looked at his list. "You're up pretty early, Mr. Holst," he commented. "You came in yesterday at 1930, and it's only 0400 now. We like our guests to rest at least twelve hours between trips outside, sir. It's safer that way."

"But I don't sleep much anyway," I told him, "and I can loaf around back on Earth. I came here to see the moon, not sit around a hotel."

He peered at me carefully. I don't know how I looked, but God knows I felt alert enough to drive that buggy all the way to Tycho. I was just wondering if I should offer him a bribe when he nodded. "All right, I guess it'll be okay. Suit fourteen, Selene five; sign here, please."

The usual procedure included a half-hour equipment check, but I had no intention of hanging around that long. I gave everything a cursory once-over, made sure oxygen, power, and ration indicators showed full, and was rolling eastward within fifteen min-

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utes. Ten minutes later I was out of sight of the Prinz Crater colony. Pausing only long enough to pull the radio beacon out of the buggy, I turned north and headed for Mairan.

Four hundred twenty kilometers north of Krieger D, the map said. That put it about five hundred from my present position, and at forty kilometers per hour it would take over twelve hours to get there, not counting any cautious skulking I might have to do. The adrenaline-fed energy I had felt back at the hotel was ebbing fast, and my current lack of sleep was making itself felt throughout my entire body. For a moment I was tempted to find a convenient hiding place about halfway to Mairan where I could take a nap. But only for a moment. The sooner I got to the mine, the better chance I'd have of getting through whatever security Stark had set up there. Given enough time, they could button the place up so tight I'd never get near it.

So I gritted my teeth, kept my foot on the accelerator, and kept myself awake by making a mental list of the newsmen I was going to send dreams to as soon as I was safely holed up.

My eyelids felt like lead by the time I completed my wide circle of the Mairan region and parked the Selene a few kilometers north of where I estimated the mine to be. The subterfuge was probably so much wasted effort—they were bound to be guarding the northern edge as well as they did the southern part—but somehow I felt safer approaching from this direction. I had spent a lot of my trip here trying to recall the latitude and longitude figures I'd seen in Stark's dream, figures that seemed to match with the rough idea I had of the mine's location. If I was right, I knew to within a kilometer or so where my target was. If not, it could be a very long search.

I don't know how long I walked. The whole area was hilly and littered with rocks, and I was feeling pretty groggy as well, but I didn't fall over too often, and I always had the energy to get back up again. Still, my reflexes weren't as bad off as I feared, because when I topped that last rise and saw the spacesuited figures not more than half a kilometer away, I managed to crouch down into a shadow without standing in plain sight for more than a couple of seconds.

There were four of them that I could see from my position. They didn't seem to have any mining equipment, but rather were poking at the ground with spades and long probes. I frowned to myself. Stark's men looking for new veins of ore? Or had I stumbled onto the wrong party completely?

There was no point in taking chances. I edged off to the left, intending to circle the group. With most of my attention on the others, it was not particularly surprising that I never saw the metal plate sticking out of the ground until I had tripped over it.

It says a lot for my mental state that I had rolled over and levered myself into a sitting position before it occur-

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red to me to wonder what a metal plate was doing half-buried on the moon. Looking closer, I saw that the corner I had stumbled over was smooth-faced and was coppery silver in color. Only about thirty centimeters of the plate was visible, the rest being under the loose soil, and the edges I could see were ragged, as if the plate had been torn away from something else. Just at the corner was a mark of some kind etched into the surface. An identifying mark, perhaps, except it was like no letter or symbol I had ever seen.

Curiosity overcame my caution. Getting a good grip on the plate, I pried it upwards. It was a good four or five square meters in area, but the gravelly soil was loose and offered little resistance. I never got a real look at the underside of the plate, though, because something underneath it caught my eye. Something light yellow in color, about a meter long; with four arms, two legs, and an incredibly alien face...

"Okay, buddy, lift 'em."

I was halfway through my backward jump before I realized the voice had come through my headphones and not from the alien figure in front of me. Raising my arms, I slowly turned to face the figure striding toward me. His spacesuit held the insignia of a Marine sergeant major, and his gun was holding very steadily on my middle. He gave me an appraising look, glanced at the alien I had uncovered, and nodded inside his helmet. "This is Conlin," his voice said in my ears. "I've got a snooper up on Hill Ten; I'm bringing him in. And we've got another body up here, too."

The major at field HQ decided to wait for higher authority to arrive before questioning me, and so I had to sit for an hour in a tiny office with two taciturn guards. They very obviously considered me a spy—my single attempt to ask a question made that quite clear—and I was almost relieved when my interrogators finally came. There were two of them: General Blaine and a grim-looking Colonel Stark. The latter nodded to the guards and waited until they were gone before speaking.

"Well, Morgan, just what in hell are you doing here?"

"What was that thing I saw on the hill?" I asked, ignoring his question.

"Look, mister, you're in enough trouble already," Stark gritted. "Answer my question."

I was too tired to fight him. "I thought you were trying to pull a fast one with the new iridium mine. I was trying to stop you."

"Iridium mine?" Blaine spoke up.

"There was a vein of ore opened up just before we found the wreckage, sir, but we haven't had time to work it at all. It's in my report."

"Oh, yes. Go on, Mr. Morgan."

I told them the whole story, from Louise Holst's first visit, through my contacts with Larry and Stark, to my panicky trip to the Mairan area. When I finished, Blaine turned to Stark.

"I think we'd better get Mrs. Holst up here as soon as possible," he said.

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"No telling who else she might go to with her fears."

Stark nodded. "I agree, sir." He glared at me. "No telling what kind of nut might listen to her, either."

"That's unfair, Colonel," I complained. "I told you the facts I had. What sort of conclusion did you expect me to come to?"

"No one asked you to draw *any* conclusions, as I recall," he snapped back. "But you just had to play private eye and stick your nose where it didn't belong. Now we've got to figure out what to do with you."

I didn't like the implications behind that, but curiosity was overriding all considerations of good sense. "You could start maybe by telling me what's going on out there."

"Forget it," Stark said darkly. "You know too much already."

"Look, Colonel, you can't leave me with half an answer like this. Lock me up, threaten me, *shoot* me if you have to, but tell me what the hell that thing was."

"It was part of the wreckage of an alien spaceship," Blaine said quietly. Stark looked at him in astonishment, but the general shrugged. "He's right, Avram. He has to know the whole story now. It's not like we can lock him away from everyone." To me he continued, "Colonel Stark's men ran across part of the ship and one of the alien bodies near the iridium vein you mentioned. Everyone who was near the site, whether he had actually seen it or not, was immediately sequestered and a security seal was slapped over everything and everyone involved. So far all we've found are bits and pieces that seem to be from the ship's hull and *very* small chunks of machinery and maybe electronics. Plus some bodies, as you already know."

"So why was Captain Holst so upset when I first contacted him?" I asked. "I remember distinctly the phrase 'he can't get away with it.' "

"Holst was violently opposed to the security measures we were taking," Stark said, clearly not happy at telling me all this but apparently willing to follow Blaine's lead. "He thought more damage would be caused by a coverup than by spilling all of it right away."

"I think he's right," I told him.

"Then think again," Stark shot back. Suddenly, through all his anger, I saw how worried he was. "You don't seem to realize how big a bomb we're sitting on here. If we don't announce this properly we could rip civilization apart. The whole world system has been balanced on a knife edge for the last century, and this is more than enough to bring it down. We simply *cannot* afford to let even a hint of this get out. Not yet."

"Nuts," I said. "Civilization isn't all *that* fragile. People aren't going to curl up and die just because you've found some chunks of metal and alien bodies...." I trailed off as an uncomfortable thought struck me. "You *did* say that's all you found, didn't you?"

Blaine nodded. "You see our problem now. The cultural effects will be bad enough, but the political ones will

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be even worse. So far we've found nothing that even *looks* like an alien weapon, let alone one that might still work. But will everyone believe that? I don't think so. And all it would take would be a single doubter, a single preemptive attack, to spark off a major war. Coupled with an unpredictable reaction from the general public over the discovery, that war might become this civilization's last."

It was an overly dramatic speech, but I hardly noticed. What he said made uncomfortable sense.

Blaine continued, "This is why we're asking for your cooperation. We have no idea yet where this ship came from, what it was doing here, or even how it crashed, and we need those answers long before we can start preparing the public—and foreign governments—for this shock. I might point out that Captain Holst came to this same conclusion once he had thought things through."

"We'll have your cooperation, too," Stark added. "Willing or otherwise."

"Avram, your threats aren't going to work this time," Blaine said, looking suddenly tired and very old. "Mr. Morgan is a Dreamsender. You can't lock him away in Leavenworth and keep him from talking to anyone. If he won't go along, we've lost the war."

"Not necessarily, sir. There are many ways of destroying a man's memory. Or we could put him into a long-term coma if necessary."

"Save your breath, Colonel," I said. "I do have a working conscience, you know. No one will ever hear about this from me." The last statement was only probably true, of course. I still wasn't really happy with the whole idea of a coverup, but there didn't seem to be a better alternative at this point and I was willing to go along with it for now. Whether the army would be a responsible guardian of the secret, though, was something else again, especially if they turned up anything of real military value. But now that I knew how much useful information could be gleaned from another's dreams, I felt sure I could keep tabs on major developments up here, and if someone got too far out of line I could always blow the whistle. But I obviously couldn't even hint at such threats. As long as I was a prisoner my bargaining power was just a fraction above absolute zero.

Either Stark read something in my face or he was just naturally distrustful. "I don't think we can afford to believe him, General. Once he's out of here there's nothing to stop him from calling anyone on Earth and spilling the whole story." He squared his shoulders. "I'm willing to take responsibility for his treatment, sir."

"Not so fast, Avram. Mr. Morgan could be of considerable service to us." Blaine was giving me a very speculative look. "Mr. Morgan, you said you sent a dream from here back to Earth, correct? Was there anything unusual about that contact?"

I shrugged, wondering what he was getting at. "No, not really. It wasn't harder to make or maintain contact, if that's what you mean."

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"Any unusual time delay between question and answer?"

"No. Not that I noticed, anyway."

Stark frowned. "But Earth's one and a quarter light-seconds away from here. That means a two-and-a-half-second delay, round trip."

"It wasn't there," I told him.

"Which means dreamsending is very possibly instantaneous," Blaine said. "And distance didn't seem to affect it."

Stark and I both stared at him. Then, slowly, Stark nodded. "I think I understand, sir. But we'd need a name and face, wouldn't we?"

"I don't know. We're talking about a whole race, not a specific individual. It may be possible to get someone at random just by knowing what they look like generally."

"It's worth a try, certainly," Stark agreed.

"If it's not too much trouble," I cut in irritably, "would one of you mind telling me what you're talking about?"

They just looked at me . . . and suddenly I understood. "Oh, no. No. Forget it. I won't do it."

"Come now, Mr. Morgan," the general said soothingly, "we can at least discuss it, can't we?"

And in the end I gave in.

It's been nearly a year now, and I really have no complaints. I would have preferred being on Earth, but Blaine wanted everyone involved with the project kept isolated at the new base in Mairan Crater, himself the single exception. Still, my quarters are quite comfortable and I'm treated with the courtesy due me as the chief—and only member, so far—of the new Office of Alien Communication, so I suppose I'm doing pretty well.

My Seipaic contact, Garun'Sutt, has finally gotten over her original terror at my alien presence in her dreams and is beginning to consider our relationship something of an adventure. I suspect this is partly due to her government's interest in her communication with me and the resulting attention she gets from her people. It's not everyone, after all, who can talk to an alien who's at least—we estimate—fifty light-years away. But whatever the reason, I'm not complaining. I'm still not sure why I always get her when I send out these dreams, though I suspect her face is just very similar to that of the first dead Seipai I saw. Since she seems to be my only contact I'm glad she's calming down.

We've started exchanging factual data about our respective races, and are trying to figure out a way to locate each other's planet. Blaine isn't absolutely sure that's a good idea, but I think that by the time we solve the problem I'll know Garun'Sutt and her people well enough to know if we can trust them. In fact, I'm secretly hoping the Seipai can get a ship here to visit us within my lifetime. The way Stark and his PR men are pussyfooting around the whole issue, I figure there's an even chance Earth won't hear about the Seipai until they actually drop anchor here.

And I'd love to be around to see the headlines that day. ■

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THE ASTOUNDING ADVENTURES OF ISAAC INTREPID

Probability Zero

Things were going from bad to worse to still worse.

Gasoline was selling for $78.33 a gallon—when you could get it. The environmentalists had seen to it that coal would never be used again. Nuclear energy was completely outlawed after the tragedy that turned Six Mile Island into 24 Quarter-Mile Islands. Microwave energy was being studied, but the powers-that-be at the Proxmire Institute estimated that it would be a quarter of a century before they would have a thorough report on it.

The situation grew more intolerable every day, until finally the President sent out a desperation call for Isaac Intrepid. The great man rushed to the White House, pausing only long enough to put the finishing touches on the fifth edition of *Intrepid's Guide to the Mosses and Lichens of the Amazon Basin.*

The problems were laid out in great detail, and Intrepid retired to his attic laboratory, working nonstop for the better part of two weeks. At that time he emerged and returned to the White House with the Intrepid Energy Synthesizer, an intricately-wired plastic globe some eight inches in diameter. At the press of a button, energy glowed unceasingly from the globe in virtually unlimited quantity.

Because he was nothing if not idealistic, he insisted that the government manufacture the synthesizers and issue one free to every citizen, and further demanded that they be sold at cost to all other governments with the stipulation that they be freely given to the energy-starved citizenry. (For himself, the great man refused all offers of money, asking merely for world-wide serial, comic book and motion picture rights to the story.)

Within a year the world was humming happily with unlimited free energy, and took on the aspects of a truly contented global community.

Then, suddenly, a U.F.O. was spotted over Washington, D.C. It didn't remain U. for very long, and soon identified itself as a ship from Xi Bootes. The President ushered the pilot into the Oval Office.

Isaac Intrepid, like the rest of humanity, was watching this momentous event on television when the President emerged from his office. "If Dr. Intrepid is watching," he said, "I would like him to come to the White House as soon as possible."

Intrepid boarded the nearest bus and arrived in a mere matter of hours. A moment later he was standing face-to-face with the visitor from Xi Bootes.

"Welcome to a world of love and peace and sharing," said the great man. "I offer you not only my friendship and respect, but I'd also like you to have—free of any charge—an Intrepid Energy Synthesizer."

The visitor looked at him for a moment. "I don't know about this love and peace and sharing stuff," he said at last. "I just work for Intragalactic Energy, Inc. I was sent here to collect the bill for all the power you've been using."■

by MIKE RESNICK and LOU TABAKOW

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Two Views of the Movies

STAR TREK: THE VINDICATION by G. HARRY STINE

On pages 167-168 of the November 1968 issue of Analog, I reviewed the motion picture, *2001: A Space Odyssey.* The review was exceedingly controversial because I called it the way I saw it. In brief, it was not a favorable review, and this cost me far more dearly than any of you will ever know. Yet I would not retract one single word of that review today, twelve years later. The review ended:

"*Star Trek* is doing a better job with a lot less money and fanfare."

I wondered at the time what Gene Roddenberry—who had just put the third season of *Star Trek* in the can with no prospects for any renewal for the series—could have done if he'd had the budget commanded by Stanley Kubrick . . . a mere 10-million 1968 dollars, equivalent to 22.5-million 1979 dollars.

Now we know.

Star Trek—The Motion Picture is in direct contrast to the Kubrick film in more ways than one.

Gene Roddenberry, with a $40-million budget that permitted him to hire some of the very best the business has to offer—Asimov, Jesco von Puttkammer, Robert Wise, John Dykstra, Doug Trumbull, Alan Dean Foster, and a list of professionals that reads like a "Who's Who" of outstanding artists and experts in the science fiction and science fact worlds—vindicated himself and thousands of others like myself who knew the man and knew that he would produce a motion picture that would be human, positive, exciting, and classic.

Few people know what Gene Roddenberry really had to do to achieve this. I saw only part of it from the sidelines as an interested but non-involved spectator. Since I am honored to have Roddenberry as a personal friend, I got a lot of the inside news of things as they happened, including many things that I should not reveal because they were personal communications in confidence. Suffice to say that Roddenberry gave a great deal of his life force to produce

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the movie, to maintain creative control over it, and to make it the way that he knew it should and must be made. He once told me that he *had* to make the movie to secure his career. . . as if the TV series had not already more than done so! He made the film not to satisfy the millions of *Star Trek* fans who are devoted to the Great Bird of the Galaxy and to the characters and background of Roddenberry's future. He made it to satisfy Gene Roddenberry, a man of deep personal convictions about the nature of the human race and its capability to envision a hopeful future—and its willingness and imagination *to make that hopeful future happen!*

Of course, we all enjoyed seeing the return of Kirk, Spock, Bones, Scotty, Sulu, Uhura, Chekov, Chapel, and the mighty Enterprise. But beyond that was the film's ability to maintain the integrity of Roddenberry's future universe and the perspective that it maintains on our history to date. In the February 1968 issue of Analog in the first magazine article written about *Star Trek,* I stated that *Star Trek* was the Buck Rogers for this generation, this period, this time frame. And it is. It is also equivalent to the Heinlein *Future History* with the same long-range view, integrity, and potential impact.

Altogether, the entire *Star Trek* phenomenon culminates to date (I hope there are more *Star Treks* to come!) in this strikingly beautiful motion picture that lifts us above the petty annoyances, problems, crises, and potential disasters of today to show us and tell us, "Hey, we're gonna make it after all! We *can* make it after all! And we *will*!"

There are those who cry that we have reached our zenith, that we are insignificant, that we will do nothing but destroy ourselves, and that the future holds nothing but death, destruction, disease, and decay. Some of these people were the professional critics of the film. But what do they know, right? One can always find flaws, even in this motion picture. Millions of people all over Planet Earth and especially in America believe that there has got to be this better future; otherwise, what is there to work toward? *Star Trek, The Motion Picture* along with the TV series is based upon a common factor so often overlooked by doomsday experts and critics: hope.

"Out there" we will certainly find life forms and intelligences far greater than ours. In some far distant time, the human race may indeed evolve into creatures of pure mind and energy. But, in the meantime, we are human beings with human traits, foibles, loves, hates, drives, illogic, and creativity. It's *fun* to be a bi-sexual human with a universe to explore in the company of other humans and humanoids . . . as Spock discovers.

In *2001: A Space Odyssey*, the human adventure ended.

I prefer Roddenberry's future: the *human* adventure is just beginning!

And if you don't think *that* will have an impact on our culture, on our

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way of thinking, on our young people, and ourselves, let's take a look in another twelve years in 1992, and we'll see if this is an accurate assessment, too...

OUT THERE

by LAURENCE M. JANIFER

In the beginning there was Motion. The first movie spectaculars were simply movies: a man fired a gun at you, a train roared straight into the screams of the audience—for a short while, motion alone was marvelous.

But people get used to everything, and much too quickly. The first spectaculars, so christened, were a long step into lavish insanity: the "mile-deep set" of *Intolerance* (and its ten thousand extras), the crowds and mobs and milk-baths of even the silent-era deMille—those were our new marvels.

Then 1927 arrived. You ain't heard nothin' yet, and it developed that you hadn't: almost at once, "spectacular" meant the Hollywood musical. This form had an exceptionally long life, all the way from *The Jazz Singer* through a spate of *Follies* and imitations thereof, past the mad world of Busby Berkeley and a sheaf of Esther Williams jobs that have to be seen to be disbelieved, right on to *Hello, Dolly*, *The Sound Of Music*, *Funny Girl*, *Funny Lady* and a few more cast up on various beaches (anybody remember *Star!* or *Half A Sixpence*?). The critics hated these movies, as they had hated the sets-and-extras spectaculars of the silent days, right up to the day of their decline, when nostalgia set in with a crash audible at the bottom of the Mindanao Deep. Nevermore, quoth the raven very sadly, as the big screens started to fill up with *That's Entertainment I* and *II*, anthologies of past glories. Nevermore; the glory has departed. But the raven was dead wrong, as he usually is.

All that has changed is the core of the structure. Instead of motion, sets, extras, songs, dances or revolving Ziegfield chorines, we are now faced with Science. Critics, many of whom are simply overawed by any line of dialogue including the words *equation*, *pulsar* or *photon*, have been awfully kind to the new spectaculars—at least those with a large enough budget. This kindness is beginning to look like a terrible mistake.

The two largest have just (as I write) opened against each other: *Star Trek* (total estimated costs a bit over $100 million) and *The Black Hole* (perhaps only $40 million, all told). As movies, they make a fascinating, almost classic pair: *Star Trek* is immensely worthy and fairly dull, full of defensible theories and interesting SF notions, and perhaps three really good moments. *The Black Hole* makes as little sense as anything I've seen since *Rocketship X-M* (which is to say: "None whatever, and look round for that case of minus numbers I put up against a hard winter, would you?") —and it is marvelously cheery and ex-

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citing, full of shoot-'em-up action and root-for-the-hero chases; turn off your mind and you'll have as much fun as I hope you had at *Star Wars.* But you will have to turn off your mind—entirely.

The central message of both films, and of most of the new spectacular wave, has been around since *2001: A Space Odyssey*, at least, and you can catch one version of it in the introduction to any TV *Star Trek* episode. Another version, as stated by Dr. Hans Reinhardt (Maximilien Schell) of *The Black Hole*, goes: "I will solve the one final mystery that has eluded mankind from the beginning...(in a place where) the laws of Nature vanish." A third version:

Out There. Where anything's possible. Experiences we can't even dream of, salvation, understanding, oneness with the universe, or an escape from all the universe's troubles . . . "I go," as Voltaire said under slightly different circumstances, "to seek a great Perhaps." Out There—where anything is possible.

Well, damn it, I keep thinking of Nero Wolfe's observation:"It is the fashion to say that anything is possible. The truth is, that very few things are possible." Out There is as much an article of faith as the existence of God; and it is the cause of some discouragement with these SF spectaculars.

A public interest in science is one thing, and devoutly to be hoped for (it hasn't arrived much). A public interest in, even a public fascination

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with, science-romance (which bears the same relation to science that all those Lives of Composers movies bear to music) is a whole other kettle of fuming nitric acid. But what we have in the SF-spectacular *is not science*, but science-romance; go out and check the big screens, or (if he is still around) try *Buck Rogers* himself on your little home Illuminatus. (If he's been cancelled, try something else; for a while, now, there is always going to be something else, as *Battlestar Galactica*, *Space: 1999*, *Salvage 1* and others bear witness.)* We are drowning in this goop, and it looks as if the goop may have a long life. Its existence is built-into the very notion of a spectacular.

The spectacular world, of any type, touches reality only when absolutely necessary and sometimes not then; it is candy-flavored and rose-colored and it doesn't so much insist on the triumph of Good, as assume it. All this goes with the positive pleasure we do seem to get from watching immense sums of money ladled out with a casual, careless, generous hand—and it's not necessarily a bad world to have around. It's restful, and it's fun, and we know perfectly well that we can't believe it. Nobody is ever going to hold up *Hello, Dolly* or *The Greatest Show On Earth* as a checkable picture of actual life.

But most audiences know a little more about misers, innocent males of 33, and even acrobats and injured trapeze artists, than they do about the material of the SF spectacular; there is a real danger that science-romance is being taken seriously. That, in other words, these movies—good and bad alike—are feeding the belief that, out there, anything really *is* possible.

Science, say these movies, is all-powerful—and, by a simple process very near logic, if the world includes some discomforts (not to mention crimes, horrors and the rest of your average newspaper front page), then science can remove them—and, since it doesn't, it obviously *chooses* not to. Here is the root of the mad scientist (whose mark is cold efficiency—in other words, I'm afraid, rationality) as well as the hero, heroine or robot (whose mark is charm—in other words, the assumption that the structure of the universe, and that evanescent attitude called personality, are of equal size and weight). The mad scientist— Dr. Reinhardt is a fair sample—may go Out There, but only for personal profit or glory; he has no interest in getting Utopia started. (A smaller-budget movie just released

**The fascinating, uncompromising TV version of Ursula K. Le Guin's "The Lathe of Heaven" provides a nice example-by-contrast. Because of the entire lack of gargantuan space-epic-type special effects—the simple insistence that everyone was living in year X, so you were, too—a few critics were caught making noises about its "not really being science fiction." The* New York Times *(Jan. 9) ought to get some sort of Oddity Award on this one: the burden of its complaint was that, since there is a fair sprinkling of SF on commercial channels, public television should not waste valuable time on it. Memo to John J. O'Connor: There is a lot of news on commercial channels; should PBS cut back its news programs?*

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has an even better example: try the 1979 *The Shape Of Things To Come* for Jack Palance's foaming scientist-dictator.) The good guys (and gals—and, especially in *The Black Hole*, some wondrous robots) are all for Utopia, and its existence is prevented only by the fiendish plots of those deplorable logicians.

Star Trek, certainly, makes more sense than our basic sketch—but not, at this level, very much more. It, too, heads for a burst of mystic perfection, involving (if I have all this right) a leap to a new order of being when the totality of the present universe is learned and understood. *Star Trek* does its best not to take this sort of thing too seriously—Captain Kirk's version of Out There is William Shatner's throwaway command to his helmsman: "Thataway." But the humor, and the where-possible accuracy, fade in recollection, as against the worshipful miles of exploring camera-work: shuttle-stations, spaceship docking facilities, the *Enterprise*, the immense, slightly *2001*-like V'ger complex—the language of the spectacular, of science-romance.

(I want to pay some respects here, if no one minds. These movies, like *The China Syndrome* a while back, deserve a good deal of praise as movies. *The Black Hole* is, as I've said, immense fun, and if the actors wander around a little vaguely, the effects and chases, even when they make less sense than I can convey, are worth the price of admission; a couple of fine robots, notably Vincent, whose voice, unless my ear's gone, is that of Roddy MacDowall, are worth several times that. In *Star Trek*, nobody is immune to the shot of the *Enterprise* going into warp drive; Leonard Nimoy is, as always, just a little better than the script is supposed to allow; and Persis Khambatta is the most diverting figure I have seen since, maybe, Liz Taylor's peak, a long while back. John Barry, *Star Trek,* and more especially Jerry Goldsmith, *The Black Hole,* have come up with first-rank musical scores, too—a greater rarity in movies than first-rank acting.)

But: in the end, science-romance is the clear winner; that's what people are carrying away with them. SF readers will have various sorts of fun at these movies, and the others sure to come, from *The Empire Strikes Back* to whatever Disney, or Gene Roddenberry comes up with next time round. They—we—can be assumed to know better, to be on familiar enough ground so that there is no real danger of confusing this sort of spectacular with real life.

Most of the audience, though, has no such immunity. And, when I think about it, what I am truly afraid of is the backlash—when the message ("Anything is possible Out There—and Science can go and bring it back for us, *right now*") sinks in for good, and people look around and notice that Utopia has not arrived. Damon Knight, looking at some earlier movie SF, was musing about an anti-science pogrom back 1956. It hasn't arrived

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yet. But I think it's come a lot closer—with the immense aid of Out There, of the new spectacular, of science-romance. ■

TVSF
by LAURENCE M. JANIFER

Today's text is from Chapter 17 of *Brave New World,* which used to be a novel by Aldous Huxley. It somehow became Required Reading, and has just (as I write, a little stunned) turned up again, this time as a three-hour NBC Movie Special. Quite a lot of Huxley's book got into the TV show—the only important lack, as I recheck it, seems to have been what the novel was about—along with good scenic effects, a markedly original musical score, and some first-class acting (Bud Cort, Marcia Strassman and Kristoffer Tabori). Our text, of course, did not find its way in; it is what the whole thing is about:

"You can't have a lasting civilization without plenty of pleasant vices."

It kept running through my head, as I found it harder and harder to distinguish the Brave New World from the ads that surrounded it. But NBC is not any more anxious than any other TV network or station to hold that particular mirror up to nature: it would disturb hell out of people. Huxley, of course, meant precisely to disturb people, and that most violently, and most of what we're used to reading as SF *does* mean to disturb, in one way or another—not only the dystopias like Huxley's, but the simpler if-this-goes-on warnings, the satires, and what I take to be the two basic assumptions of SF, at least since Wells and Verne. These are (a) that knowledge and understanding are goods in themselves, and worthy of increase, and (b) that entirely different sorts of lives and societies from the ones we know may not only be possible, but may offer, here and there, a few improvements. (There is an anti-SF, which begins by denying (a)—the movies' Mad Scientist is one classic case. And the idea of the equality of sophonts, now a staple of SF and usually referred to as a basic assumption, is one of the first deductions from (b).)

This fact—that the root assumptions of SF have a marvelous tendency to disturb people—is why there is virtually no SF on TV.

The notion is the same one that '50s and '60s revolutionaries, when they had any sense at all (not terribly often, thanks) were complaining about: as soon as a disturbance acquires some visibility, it gets socialized, labeled, placed nicely among the fiddling categories we are all supposed to file-and-forget—sanitized, sloganeered, and smoothed over. The revolution changes nothing; it just continues, and people find it rather chic to go and visit, now and then.

Some years ago, talking about little-magazine SF, I said that, as more of it surfaced, glad cries went up to the effect that SF was being accepted. It wasn't, I said; it was being

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diluted—that particular trend headed asymptotically toward a future in which SF would be as much a category as "novels about Nebraska."

Such a future might be, on balance, pretty good, though I doubt it; a future in which, as on TV, SF is simply accepted to death is not good at all.

Hold the Specials for a minute. The most popular SF you can locate on your home Illuminatus now is *Mork and Mindy.* A good many people insist that it isn't SF at all, but I find it a little tough to agree that a show about an alien, on Earth to observe and report back to his distant-galaxy superior Orson, can be much of anything else. True, there is little, if any, science tying the notion down—but this, in a world which has given us the collected works of Ray Bradbury (in the original and as adapted for screen and tube), a terrible lot of reprints of John Carter of Mars novels, and most recently *The Black Hole,* can't be any sort of serious objection. The show is also a comedy—but so is a lot of SF, even a fair percentage of good SF. Despite a great deal of stuff aimed at what I take to be the foetal mind, this one does have Robin Williams and Pam Dawber, who are not my ideals (I'd pay in gold to see Shields and Yarnell in the parts), but who make the show a good deal more worth watching than it ought to be.

But God knows it doesn't disturb anyone, and isn't meant to. And neither does *Buck Rogers,* which tosses very few bones even to Relevance. The frantic rebirths of *Battlestar: Galactica* are no improvement. (So much money's been spent on sets and effects that the thing just can't be allowed to stay dead; like Dracula, it is always there for one more round.) As for the flurry of SF specials we've been having—well, *The Lathe of Heaven* can scarcely be praised too highly (it's the only PBS entry on this list; SF has gone tube-commercial in a big way), and *The Martian Chronicles* survived not only Rock Hudson, but some ill-advised word-for-word adapting (what works on Ray Bradbury's written page can sound stunningly mawkish when actually spoken out loud), to come through as a textbook example of what a special effects crew, and a little decent acting (Roddy MacDowall especially noted), can do when the aim is not to knock you dead with size and complexity.

Almost instantly, we got *The Aliens Are Coming,* a dog redeemed only by an interesting musical score and by the hope (unfulfilled) that the script would give the underrated Max Gail something interesting to try. And then we got three mortal hours of *Brave New World.*

I don't think the flood is receding, either; *Soap* had a dose of aliens a while back, and a guy selling fraudulent trips to Jupiter showed up on *Barney Miller* the other month—a real one may not be far behind. Barnaby Jones or the Harts could do with a Martian sidekick (I suggest Poul Anderson's Syaloch), and in the world of *WKRP in Cincinnati* anything from

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extraterrestrials to time-warps could show up, and scarcely be noticed.

Much of TVSF—and every special except those *Aliens*—goes all-out for Revelance, otherwise known as Current Problems. Without exception, these have been the chic problems-of-the-moment: discrimination, violence, war. Nobody is disturbed by this sort of thing, because we have all stopped listening; the Relevance goes straight to file-and-forget. (This is why people sit up so suddenly when *Saturday Night Live,* nearly alone against the TV tide, attacks something; it is usually the thing nobody else has been flailing at recently. Maybe those Coneheads of theirs even qualify as SF—not TVSF, but the real thing—though they did keep saying they were French.)

The Martian Chronicles may have been picked because it has virtually nothing to say that isn't currently chic: this is anti-SF, not only against (as I understand it) any form of profit system, and in favor of peace and contemplation, but flatly anti-technology and any sort of "hard" knowledge or science; the impression left is that the Martians got their extensive technological works by communing with the Cosmic All. And *The Aliens Are Coming* was one more rerun of those '50s SF-horror movies, which were SF only by virtue of materials used. No disturbance—nothing to disturb with.

But *The Lathe of Heaven* has some hard things to say about honest people with good motives and insufficient understanding—in fact, it appears to say that I'm one of those people, and so are you. This didn't appear in the TV version, which was supplied with hero and villain masks.

Brave New World had, as noted, quite a lot of disturbance to market—every bit of which was buried under a smooth-as-silk production. The book suggests (as Huxley wrote later) that human beings are required to choose between insanity and lunacy; the adaptation, as done up for TVSF, appeared most of all to agree with *The Martian Chronicles* that all we need is the simple contemplative life.

It is not nice to disturb people. TV does just as little disturbing as it can manage—honorable exceptions like *Saturday Night Live* are awfully rare. I'm afraid that SF is a disturbance—and, since SF has lately become very popular, we're being undisturbed, via TVSF, at one hell of a great rate.

I would like not to believe this, because the backwash is likely to be fierce; TV ends up influencing other media whether or not it wants to. What people expect from the tube does become, to a noticeable degree, what they expect from experience. But I do believe it; I'm stuck with it.

I will take it all back, in spades, twenty-four hours after we get a network adaptation of any normal, honestly disturbing piece of SF—from *The Food of the Gods* through *Beyond This Horizon* and *The Space Merchants* to, say, *Bug Jack Barron*—with the disturbance left in. ■

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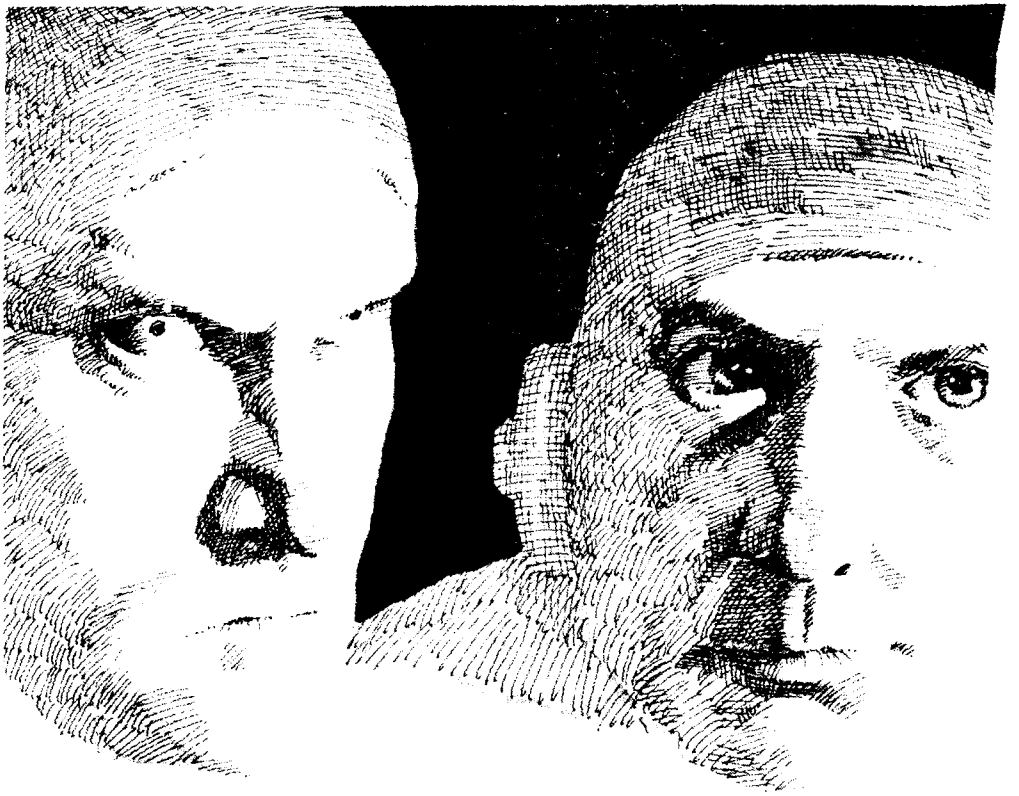

by ERIC VINICOFF and MARCIA MARTIN

With the development of the tachyon FTL drive humanity discovered that the stellar-planet creation theory was true—virtually all the nearby suns the starships could reach had planets. Since humanity's primary concerns were finding worlds to colonize and familiar life, they sought Earthlike worlds. These they found in abundance—suitable worlds too young for any intelligent life, and older worlds with races at levels of advancement short of Earth's. But none more advanced—just a handful of worlds burned bare of all life by forces only imaginable to humanity's science. Humanity wasn't the smartest race spawned in the region. Just the luckiest in somehow avoiding self-destruction.

Of course the other planets in these systems were cursorily examined. And life of bizarre types was found in bizarre environments. Some races were intelligent, and a few even technologically advanced. But there was so much to do on the Earthlike worlds. These incomprehensible races, relatively backward and oblivious to events beyond their worlds, could wait.

Then the exploration ship Tau

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Zero, conducting such a probe of the Jovan-type world Epsilon Eridani VI, named Moulay, was fired upon and severely damaged by the dominant race of that world.

Captain Kerry strode toward the briefing room confidently despite the ravages of an all-nighter in the 'morale wing' bars and red light rooms. The stim pills he had downed before breakfast were doing their deceptive work, as were the pre-mission awareness and courage enhancers. He was walking on clouds, ready to go.

Outside the room's door several

Every decision requires taking chances.
But some will take more chances than others.

Gambler's War

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officers were milling about, chatting and smoking away their last few minutes before the briefing.

Lieutenant Orloff came rumbling down the corridor toward the door, glaring lasers, his usual mood. Kerry gestured, and he came over.

"Should have come with me last night," Kerry said. "If you don't ease up, you're going to blow your hull."

"This whole crazy war is blowing my hull."

Kerry sighed. "Still on that, huh. Why don't you leave strategic planning to the Admiralty."

"What makes you think they—or even U.N. Command—know one damned thing more than us?"

"Will you for God's sake please get your mind on today's mission."

"Today's game."

"Keep thinking that way and we'll end up like AFX-47, in the deep soup."

Before Orloff could fire off a reply, a firm voice intervened. "Come with me, please, gentlemen." Colonel Foster had materialized beside them.

"What about the briefing, sir?" Kerry asked.

"Special orders, Captain. Come on."

Mildly curious about the deviation from SOP, they followed him into a bounce capsule. Down it went to the squadron cradles. Kerry felt the strong tension between him and Orloff, but as always under tight mutual control. Philosophical differences festered in the stress and uncertainty, but they were a team. They needed each other to survive.

The cradles were anthills of activity as men and machines readied the Third Squadron for battle. Eight gleaming white flattened-cigar shapes, seventy meters in length. Douglas F-72BX's. Years of intensive development had gone into adapting the standard F-72 suborbital fighter for dense atmosphere work. Twin Korchnoi C-455F ion thrusters supplied the necessary acceleration to operate deep in Moulay's gravity well. Cruiser-rated laser fusion MHD generators were required to power them. Gone was the regulation panoply of ordinance—not even lasers could punch through Moulay's soup for any range. In their place was a single fixed-forward proton accelerator tube.

They walked halfway down the long, brilliantly lit hanger and climbed into the tiny cabin of AFX-37.

"What the hell are you doing!" Orloff exclaimed. A young man in an ill-fitting flight suit was wiring a new unit into the com board.

The man turned languidly. "Hooking in my equipment."

"You foul up that board and we'll never find our way back out of the soup!"

"I'm not disrupting anything. Just enabling my computer to use your in-soup radio."

The man pointed to the observer's seat, which was folded out from the bulkhead, and smiled.

"This is a *military vessel*!" Orloff jumped into the brief silence. "You

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hired brains get pushier every wake period!"

"Dog it down, Lieutenant," the Colonel snapped. Orloff reluctantly bit off further comment.

The Colonel went on. "Doctor Chan will observe this mission, and test some new equipment."

Orloff shrugged pointedly and went over to inspect Doctor Chan's work. "*The* Doctor Chan?" Kerry asked.

"You've heard of me," Doctor Chan said without looking up.

"When a scientist of your prominence joins the research teams, it's wardroom scuttlebutt for days. The word is that Secretary General Aidala personally asked you to take the job. Have you figured out what the polyps are all about yet?"

"Doctor Chan is a brilliant cryptographer and philologist," Colonel Foster put in. "His work on the polyp language holds great promise. Which is why you will cooperate fully with him."

"I've heard some other things about you, Doctor," Kerry said. "You were a world-class chessmaster, weren't you?"

"The dalliances of youth."

"So you moved on to more adult pursuits. You're rather legendary, you know—we Rangers bet on everything. Is it true you've been banned from every casino in Sol System?"

Doctor Chan nodded. "Very shortsighted of them—the promotional value far outweighed my actual winnings. But there are more exciting games. Much more exciting."

Colonel Foster handed Kerry a black tape disk. "Your copy of the mission briefing. Scan it and get tight. The other crews will be scrambling in six minutes." He ducked out after an exchange of salutes.

The hatch sealed with a clang.

"I'm done," Doctor Chan announced, and began bolting the panel back in place. Orloff was watching unhappily, but not closely enough to spot him attaching a small gray metal capsule under the engineering console in the process.

Kerry fed the disk to the flight computer, then he and Orloff scanned it. A typical scout probe of a new landmass discovered in the southern hemisphere. "Strap in, folks," he said sharply.

As they did so he went on. "Doctor, do your testing, but remember this is a combat mission. Don't get in our way."

The officers activated their boards, and watched the ready lights for the rest of the squadron go from red to green.

"Squadron Three—green go for launch," droned Tower through the com to the pilots.

Kerry waited his turn, then barked, "Three-Seven, roger," into his throat mike. His hands moved over the piloting board, locking in the program. Orloff sat back and fidgeted. His job would come later.

Status lights indicated that the hanger was evacuated of people and atmosphere. The deck rolled back,

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and in its turn AFX-37 was slung by its cradle into space.

Shipboard pseudograv immediately replaced Orbital Base's. In the stern camera screen Kerry saw the great white globe dwindle. Twenty-nine months ago a star freighter had disgorged a machine into orbit around Moulay. Drones had broken up a tiny moon and fed the chunks into its maw. The machine grew. In less than a month it became Orbital Base. More ships brought personnel, supplies, equipment and the F-72BXs.

"Squadron Leader to Seven, do you copy?" came another voice from the comset speaker.

"Seven here," Kerry replied. "We copy you. Over."

"Hear you onloaded a green sparrow. Any complications?"

"Negative."

"As you say. Out."

In the STADEX tank Kerry could see the eight white dots in a tight V formation, arcing down toward Moulay.

Kerry leaned back and sighed. So far, routine. The computer was doing most of the work. Once in the soup, though, that would change.

"Four point one minutes to atmosphere," Kerry said to Orloff. "Time to unlimber the gun."

"Roger." Orloff brought his proton gun status lights to green. "Ready to blast."

The soft cough startled Kerry—he had almost forgotten about Doctor Chan. Before he could say anything Orloff demanded, "What do you want?"

"To be informed of our situation."

"We're about to make a scout run," Orloff grated. "An hour from now we could be dead. Did you think about that before butting in?"

"Quite a bit, I assure you. But the probabilities are favorable, and I must monitor the polyp radio transmissions at close range."

"What's wrong with the beams they keep throwing at Base?"

"Too limited in nature and intent."

"You know their intent?" Kerry cut in sharply.

Doctor Chan merely smiled. His position in the rear of the cabin was such that he could lean forward and manipulate his newly installed computer. He did so, checking it over.

On the forward camera screen a chord of Moulay grew against the starry mat. Awesomely large it was, and coiled around with fuzzy bands of yellow and brown. Tints of deep blue stood out at the pole. Paler zones were barely visible, small spots moving slowly beneath the outer atmosphere layers.

"We make war on a race we know virtually nothing about," Doctor Chan mused.

"They make war on us," Kerry corrected. "We're just trying to find out why. We can't have a hostile unknown here while we colonize Two. That's the official line."

"You don't agree?"

Orloff snorted—this argument was

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as old as their team. Kerry went on. "I hate to see all this money, ability and effort wasted on a planet that poses no real military threat."

"But your comrades die in this war," Doctor Chan said.

"Because we're forcing ourselves on them. First our survey probe, now these scout missions. They're too primitive to bother us in space. And we have so much more valuable work to do on worlds and with races we can understand."

"Yet you pilot scout missions?"

"I do my duty."

"Some duty." Orloff swiveled in his seat. "Playing target drone."

"I beg your pardon?"

"We dive into the soup, as close to a landmass as possible. Our scanners record data for you hired brains. The polyps jump us in their planes. We fight. Or seem to."

"Seem to fight?"

"Come on, Doc. Even you must know what's going on. They always come at us. But only to disable, not to kill. We can almost always rescue downed fighters—they don't interfere. They don't try to hurt us enough to keep us from coming back. Why? It doesn't make sense."

"There are many theories."

"Including one of yours?" Kerry drove home sharply.

"What would you propose to replace our present course of action?" Doctor Chan asked Orloff.

"Lithium fusion nukes. Destroy every landmass. Blow them back into their version of a stone age."

"Isn't that a rather drastic way to deal with such a backward race?"

"We're too damned cocky about that. We can't be *sure* they aren't a threat, or won't become one, because we know nothing about them."

Doctor Chan eyed the officers speculatively. "There are many who agree with each of you. Fortunately the power of decision lies with moderates supporting the present compromise."

"You would say that," Orloff rasped. "Mysteries to unravel, and big research budgets."

Doctor Chan showed no reaction.

"All units, tighten up," the Squadron Leader's com voice ended the conversation. "One minute to atmosphere. Stand by."

In the STADEX the V formation shrank slightly.

Kerry switched to manual override

We may as well go to the moon,
but that's not very far.
The greatest distance we have to cover
still lies within us.

CHARLES DE GAULLE

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mode just in case. Moulay had swollen to fill almost all the forward screen.

They drove into the discernable atmosphere. Drag grabbed the hull, and it began to heat up. The heavens gradually turned from black to a yellow glow.

They plowed through the increasingly syrupy cloud cover, at this level mostly droplets of frozen ammonia. The fighter bucked as it entered thick turbulance. Alkali-metal shaded fogs oozed across the screens.

The pressure grew. And grew. Gas became denser and denser, forming a medium unlike any known to humanity. The fighter crawled through it at a mere handful of hundreds of KPH. Radar range fell off drastically, and sonar took over. The screens showed undulating tan murk, leaving the STADEX computer simulation the only visual scanner.

Down, and further down they dove. "No contact yet," the Squadron Leader reported. "But they should have us on their scopes. Stand by."

Far below the STADEX showed an irregular mass several hundred kilometers in the least dimension. It was landmass S1364, discovered in a recent scout mission. Experts disagreed on their origin; either remnants of asteroids sucked in by the enormous gravity pull, or bits of the solid core thrown up by seismic activity. They drifted at this level in density equilibrium with the atmosphere.

Upon the thousands of them the polyps had built their material culture, weird structures mostly buried beneath the surface and armored against insanely ferocious storms. Polyps were occasionally seen swimming in the soup as they hunted the 'plankton' which also drifted there. They were amorphous creatures, the size of small groundcars and reminiscent of Earthly coelenterates. Liquid ammonia was their water. A few had been captured and studied, but none had reached Orbital Base alive.

"Bandits coming up at four o'clock," the Squadron Leader's voice announced tersely. "At least twelve, maybe more. Defense mode R-for-Robert. Out."

Orloff fired a test burst, grinning. Kerry switched to full manual. A century of progress had evolved back to World War II-style dogfighting. Low speeds. Awkward weapons. Insufficient communications and target tracking. Computers couldn't fight with such fragmentary data, so they gave way to intuition.

Kerry sent AFX-37 slanting down and starboard, covering 39. Its team was green sparrows, and he wanted to see them through their roughening period.

Both sides put out jamming frequencies. Communication was out. Training and experience took over.

"Battle systems in," Kerry rapped as his hands flew. 39 was a kilometer ahead, diving at a polyp plane—a slender dart powered by a fission jet and armed with a fixed-forward electrostatic cannon, primitive but

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dangerous at close range. The other fighters of the Third Squadron were also diving.

"Get out of my way!" Orloff shouted at the unhearing STADEX dot representing 39, locked in its attack run between 37 and the polyp.

39 was firing, but the polyp, apparently a vet, swerved easily. Orloff got his target. "Taking the helm!" he said as his board overrode Kerry's and brought 37 around. The cabin lurched as the proton gun discharged.

Kerry took it back and banked hard to port, hitting emergency thrust to avoid another polyp's attack. "Missed!" Orloff reported as he eyed his targeting STADEX.

But 39, coming up on the first polyp's stern, didn't. The latter's STADEX dot vanished. Seconds later a shudder wracked the cabin. "Damned beginner's luck," Orloff muttered.

"Target opportunity at eight o'clock," Kerry cut in urgently. A polyp was slicing at them almost dead-on, already firing but missing 37's foreshortened hull.

"My turn, creep!" Orloff took the helm, lined up the shot, touched the black-rimmed switch, and was rewarded with a near-miss that sent the plane retreating at reduced speed toward the landmass.

Then 37 went through a violent set of evasive maneuvers as another polyp hung on its tail, firing. "Somebody get on this bastard," Kerry whispered.

But the rest of the squadron were having their own troubles. 32 and 36 were damaged and limping home, while the other fighters were heavily engaged. The scout mission was a total bust. Somehow the polyps had guessed it—they were damned good guessers—and brought in a crack intercepter group.

The more immediate problem was survival. "Get me a shot!" Orloff pleaded.

Kerry was sweating, and running out of maneuvers. Doctor Chan was sweating too, but his expression was one of fascination and excitement. He was on some kind of private high.

The polyp was closing. Any second now it would put a shot into a thruster. And there wasn't a bloody thing he could do. No *deus ex machina.* No brilliant tactic. No secret weapon. Nothing but—

BOOOOOM!

Heat and noise battered the three men. Smoke poured from the engineering board. Alarms whooped. Circulators and emergency lights switched on. The throbbing of the thrusters was gone.

When things settled down, the first datum they noticed was that they were still alive. "Jeez," Orloff said.

Kerry shunted E-power to the STADEX, and bypassed the engineering board. Remarkably, it glowed.

"What's the scan?" Orloff demanded stridently.

"The good guys seem to be in retreat. The Squadron Leader must have fired the withdrawl bomb. The polyps are breaking off too, heading

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home," Kerry's voice held firm.

Orloff asked the question. "Any chance of our making Base?"

Kerry studied the mostly dark piloting board. "The thruster circuitry is shredded, including the backup and ES bypass. We aren't going anywhere except inside a rescue ship."

His earphone told him the jamming was off, so he triggered the E-beacon. Or tried to. The light that should have turned green began to flash red. The breath in his lungs turned to hydrogen ice. Orloff saw it too, and sagged back, cheeks pale beneath whisker stubble.

"What does the light mean?" Doctor Chan asked calmly.

Orloff turned to glare at him. "It means we're going to die down here, you damned Jonah!"

"Back off," Kerry said softly. "It's bad, but we still have a chance. Base will send a rescue ship. Without the E-beacon, it'll have to find us on STADEX. But the range is so limited down here, it'll practically have to trip over us. And this is a big world."

"How long can we survive unrescued?" Doctor Chan asked.

"Who knows? Air, water and pseudograv seem to be no immediate problem. The hull is rated for two days at this depth, with a safety margin. But we've taken a hard knock. The external stress monitors are out. If the hull weakens...we'll never know we died."

Humming equipment sounds became a discordant symphony in the silence.

"All we can do is sit tight."

Orloff unstrapped and went over to the ruined console. "I don't get it. Looks like an internal blast. How could a shot do that?"

Kerry only half-heard him, and didn't answer. He didn't want to think about anything. Orloff drew strength from agitation; he sought calm. It could be a long wait.

Doctor Chan leaned forward and activated his computer. "Good. It still seems to be functioning."

"Are you crazy!" Orloff exclaimed. "We could be breathing soup any second, and you want to expand the horizons of science!"

"We'll be here for some time, if we're lucky. It won't harm our chances for survival, and it may prove useful. Captain?"

Kerry shrugged. "Go ahead."

Orloff returned to his seat, visibly dissatisfied with what he had seen at the console, and lapsed into his own bleak thoughts.

Doctor Chan tended to his computer. He began typing on its keyboard. Putting an earphone in the appropriate orifice, he listened. Then he typed again.

Curiosity roused Kerry slightly. "What are you up to?"

"Communicating with the polyps," he replied.

That roused him the rest of the way. "You're kidding, right?"

"I don't joke. I've compiled a 'dictionary' which is programmed into this unit."

"But the best brains the U.N. could buy have been chewing at that

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wall for years. You just walked in and fell over the answer?"

"Hardly. I built on their efforts. And added a vital element—my own imagination."

"I like a modest man."

Doctor Chan ignored the comment. "Since philologists have been communicating with alien races, we've learned that many 'incomprehensible' concepts can be understood by recalling that language grows from heredity and environment."

"But we hardly know a damned thing about either here."

"We know enough. For example, we recently discovered that polyps have a multi-tonal speech system."

"You mean those bird choruses they're always beaming at us are voices?" Kerry said incredulously.

"Yes. Those transmissions, by the way, are picture-and-word primers aimed at teaching us one of their languages. With the multi-tonal clue, I was able to use the Base computers to translate much of it."

"You mean to tell me you understand what they're saying?"

Doctor Chan listened to his earphone for long seconds, then talked as he typed. "Not everything. Some of their concepts are very difficult. But enough to communicate. Here, listen—"

He touched a button. From a small speaker in the computer came a tinny chirp with two or three softer chirps and buzzes over it. Then a pseudovoice said, "Discover (verb) (first person plural) (present active imperative). We must discover." He touched it again.

"The primary tone is the base word. The subsidiary overlays modify it—person, gender, tense, case and so on."

Kerry's mind wandered. He wished there was some repair work he could do. But to do anything useful he would have needed the facilities of a Base repair dock. And EVA here was definitely out. The hull would hold, or it wouldn't. Rescue would come in time, or it wouldn't.

Doctor Chan looked very happy with what he was hearing through the earphone. He resumed typing.

"Why come down here to communicate?" Kerry asked. "Base could punch through a signal if it had a good reason."

"To do that I would first have had to report my discovery to your superiors."

Orloff was listening, a queer expression on his face. Kerry felt queer too. He didn't like what he was thinking a damned bit. He watched out of the corner of his eyes as Orloff returned to the engineering console remains and began giving them another, more careful examination.

"You haven't told them?" Kerry asked.

"Of course not. They would have taken over the communication process, and there were questions I had to ask," the doctor replied coolly.

"Like what?"

"As you suggested earlier, I have a theory concerning this odd war. It is

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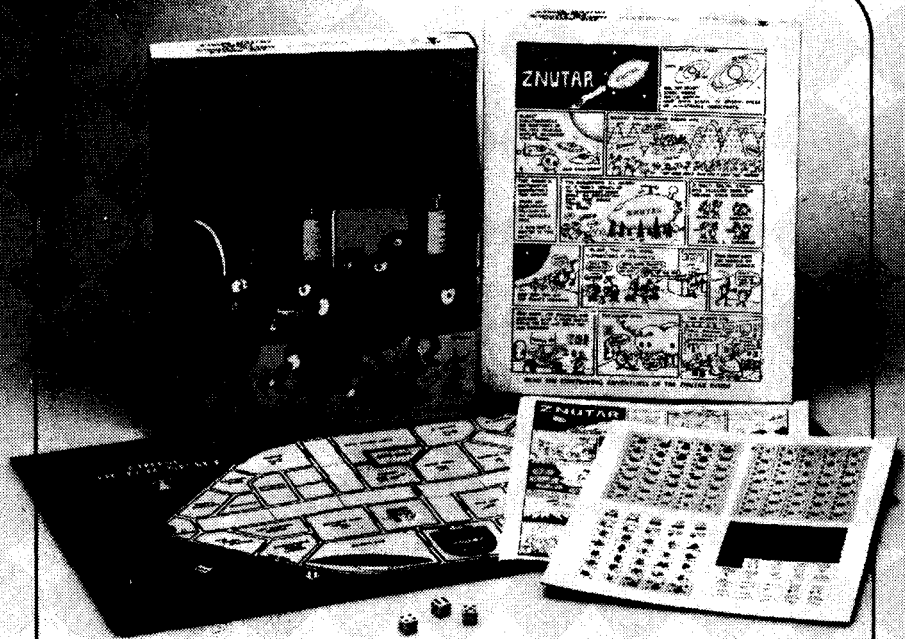

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based on another recently discovered fact of polyp biology."

Kerry felt like he had stepped into a duster's delirium. Some of the awesome pressure beyond the hull gripped him. Here he was, at the bottom of a well, chatting with a madman. "Care to elaborate?"

Doctor Chan paused much longer this time to listen. Inside the computer a tape cartridge turned. Then; "From polyp corpses we have learned that they reproduce by fission. Like some anemones. They reach maturity at about age thirty Earth years. At any time during the next four decades they can divide if they wish. Or not. If they don't, their life span approximately equals ours. If they do, two things can occur. Both new polyps may have new brains—in which case the old polyp 'dies.' Or one of the new polyps may possess the old brain, rejuvenated somewhat—in which case the old polyp lives for another generation. The odds are affected by innumerable factors, but remain primarily random."

He stopped. Kerry stared. "Is that supposed to mean something to me?"

With an inarticulate scream of rage Orloff shot up from the console like an angry kangaroo, and reached Doctor Chan in one long stride. Drawing his Walther XX, he smashed the butt through the computer's plastic case, shattering it. Doctor Chan watched the destruction calmly. "Don't damage the tape, please—Secretary General Aidala will want to hear it."

"What the hell?" Kerry demanded.

Orloff aimed the stubby laser at Doctor Chan's stomach. "Don't move," he snarled. Then he held up a bit of twisted metal so Kerry could see it. "Shell casing from a K-16 hotshot! This traitor snuck it into the console!"

Kerry turned back to Doctor Chan. "Why?"

"I had questions to ask. I needed the time."

"You may have killed us all—yourself included."

"I weighed the probabilities carefully, you can be sure."

Kerry drew his own laser and held it casually. "Sit down, Orloff." The officer complied, but kept his gun on the scientist.

"Doctor." Kerry's voice had a very hard edge. "You've sabotaged a military vessel of the U.N. That's treason. A capital crime. I want to know what's so important it's worth our lives."

"He's conspiring with the enemy! What else do you need to know!"

"Shut up. Now, Doctor, how about beginning with why you couldn't report your discovery and go through channels?"

"My theory of the reason for this war was such that I had to personally confirm it before revealing my work. Lieutenant Orloff's views are shared by too many of your superiors. I didn't want to be responsible for the genocide of an intelligent race."

"You know our policy is to make peace if possible."

"Policies change. And the reason behind the polyp's aggression is, ah, difficult to comprehend in the human

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matrix. Wrongly understood, it could lead to stepped-up hostilities."

"So, you are going to explain it to us ignorant military types?" Orloff cut in abruptly.

"Since you insist. I partially understand the polyps because of a certain affinity between our natures. I will be able to convey that understanding to the Secretary General and other leaders with the moderate viewpoint. But I doubt you will believe me."

To Kerry, it sounded like Doctor Chan had been sniffing vacuum. "Get on with it. What did they tell you?"

"The polyps are like us in many ways. They are curious. Their astronomy is naturally primitive, but they share our hunger for the space frontier. They hunger for the knowledge and ideas of our advanced race."

Kerry wasn't slow. "And they saw a chance for both in our survey ship."

"Yes. But it quickly became clear that the unique opportunity was going to slip through their allegorical fingers. The survey ship held high aloft and made no effort to communicate. Finally it began to depart. Can you imagine the magnitude of their loss, their desperation?"

Kerry breathed fear. A failure of the hull, the pseudograv, the air or any of a dozen other systems would end his own personal universe. If no rescue ship came, it would be a race between deaths. But those were familiar dangers, mulled over for many months. The worst fear was being sucked into troubles too big for him. "So they attacked."

"Of course. To attract our attention. The survey ship was obviously just observing. They couldn't take a chance on our lack of interest, our never making contact. How could they insure our interest? By posing a potential threat to our security requiring further investigation. They gambled that certain basics applied to both races. Correctly, as it turns out."

Kerry shook his head. "Start a war with a superior race, risk destruction on a gamble? I don't buy it."

"They knew they were walking a tightrope. But they couldn't be a serious threat in any case, being relatively backward and planet-bound. Moreover, to avoid what you suggest, they kept up the pretense of war while avoiding actual death and destruction as much as possible."

"Still, how could they take such a chance?"

"Because they are the greatest natural gamblers we have yet met in the galaxy. The prize was fabulous, the odds were favorable, so they went ahead. Their biology, their very lives are based on a calculated risk—they may bet extended life against death, or not. The philosophy of probabilities permeates every facet of their culture."

Kerry split his attention between Doctor Chan and Orloff. The officer was flush with anger, his eyes slitted. Kerry prayed Orloff wouldn't push him into making a judgment. All he wanted to do was come out of this alive and dump Chan in Base's lap. But his pragmatism doubted happy

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endings. His grip on his laser tightened menacingly..

"They want to be our friends," Doctor Chan assured.

"If they aren't a threat," Kerry said, "we can end this farce of a war and go home."

"That too would be wrong! They have things to teach us, and trade us. A whole new world of possibilities. We can communicate—mutual profit will follow if we let it. We *must* learn to associate with non-humanoid races—someday we will meet one more advanced than us, one we won't be able to ignore."

"But how can we trust them?"

"Communication will bring understanding. If that is coupled to good will, trust will also come. In time. In time."

Kerry shook his head again. "You're right about one thing. This could start a real war. That they killed people just to flag us down won't sit well with some folks. It doesn't sit well with me, dammit!"

"Many more of them have died. They are willing to make any amends they can. Is brutal vengeance more desirable?"

"Logically, no. But logic is a sometime thing with us. I wonder if the polyps figured that in their probability calculations."

"They will now. Before Lieutenant Orloff damaged my computer, I explained somewhat about humanity's differing reactions to them."

"Why did you do that?"

"So they can enter the period of negotiations ahead with open eyes —figuratively speaking."

"You told them a large faction wants to destroy them?" Kerry felt a new fear looming.

"Of course."

"You don't think a diplomatic lie might have been in order?"

"That's the kind of thinking which made what I did necessary. We must have mutual understanding."

Orloff caught on. "You suicidal idiot! If they have any smarts at all, they'll figure out that their reason for starting this war is going to be as popular as a cyanide airtank back home! And you told them we're on the edge of smashing them as is!"

Doctor Chan looked puzzled. "So?"

"So they've only explained their reason to you so far! They must know from combat experience we can't come beyond the soup! Don't you see! Even if that fairy tale they told you is true, their chances for racial survival go way up if we never get home!" He began tinkering frantically with his fire control board.

"You're wrong," Doctor Chan said. "You can't understand their motivations. The basic nature of their gamble hasn't changed."

"But odds do," Kerry cut in, "and that can change bets. Fortunately the polyps will have as hard a time finding us as the rescue ship, what with the lousy scanning conditions and the incredible amount of planet to be lost in. It looks like we're way off in the boonies."

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Doctor Chan coughed. "I gave them our location. They might have been able to triangulate it anyway, but I didn't want to take the risk. They are on their way now."

Orloff screamed and lunged at Doctor Chan, but Kerry got between them in time and flung the latter back in his seat. "Later for that. Can you do anything with the gun?"

"I was just checking! Looks like I can shunt around the engineering console! But on E-power it won't have much punch!"

"If we have to use it, we'll try for close range."

Orloff resumed work on his board. Kerry spun to face Doctor Chan. "I don't know which is worse, Orloff's paranoia or your naivety. That was an amazingly stupid thing to do."

"I think not. They are going to rescue us before our hull collapses, lift us to the upper atmosphere so we can call a rescue ship."

Kerry wiped sweat from his forehead. "So they say. If we can believe them. Of course your message told them we're drifting down here helplessly. So they could be coming to silence us—thanks to you."

"Trust has to begin somewhere."

"Something on STADEX!" Orloff exclaimed.

Kerry slid back into his seat. "Strap in, Orloff, Doctor." He followed his own order, then studied his tank. A large blip was closing in slowly.

"The gun is green go!" Orloff shouted. "Give me a target!"

Kerry touched several buttons. "I'm goosing us around on gyros, very slowly. Don't want to be obvious about it."

The blip was fifty kilometers away. It was much larger than a fighter. It could have been a special vehicle for moving heavy objects—or a mammoth warplane.

The sighting grid in the tank swung toward the blip.

"Don't do this," Doctor Chan pleaded. "You'll ruin everything. It's sheer murder."

Kerry's mouth was dry. He wished he was far, far away. He didn't want to die. But if Doctor Chan was right...

"Twenty-five kilometers and closing!" Orloff announced. "Effective firing range in twenty seconds!"

The sighting grid centered on the blip, and stopped.

What was the polyp commander of that monster thinking? Did he have definite orders, or was indecision tearing at him too? Did he fear?

And, assuming the polyps hadn't lied to Doctor Chan, how were they playing their gamble now; still in for the pot, or folding and cutting their losses?

"Entering firing range!"

"They aren't firing," Doctor Chan inserted. "Please don't fire first."

Orloff's hand poised over the black-rimmed button.

Kerry stared at the biggest hand he had ever been dealt. When you couldn't size up the player, you sized up his game. The polyps were real plungers. They liked the big stakes.

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He couldn't picture them bailing out. "Hold fire unless they fire first."

"It's a trick! Let them get any closer, and they can take us out before we can fire back."

"I said hold fire!"

Orloff snarled and started to stab at the button.

Kerry brought his laser around and burned a deep trench in the fire control board. Orloff jerked his hand back. "What the hell!" The gun remained silent.

"Sit still, shut up and pray," Kerry muttered.

"We're a big, fat sitting duck!"

Kerry ignored him, and concentrated on the tank. The big blip was about to swallow the central dot. Maybe they wanted to take prisoners, he thought belatedly. Or specimens.

Something bumped against the bottom of the hull. Orloff grunted as though hit, then retreated into wary silence. Doctor Chan was riding his excited high again. Kerry wiped again at the sweat above his eyebrows.

One of the surviving displays on the piloting board flickered with new data. "We're rising!" Kerry shouted.

Kerry watched in the tank as the reassuring blip of the rescue ship homed in on his com signal. The mysterious polyp vehicle had disengaged seconds ago and dropped away beyond range. The fighter was falling, but slowly so the ship would have no trouble retrieving it.

He turned to Orloff and Doctor Chan. The latter was under control again, and Orloff had let the fact that he would survive mellow his mood to mere sullenness. "Who was that masked man?" Kerry asked, giddy with relief.

"I beg your pardon?" Doctor Chan asked politely.

"Just part of an ancient legend. We're going home. Pickup in thirty seconds." He sobered. "When we get back to Base, Doctor, there's the matter of your sabotage. It'll be in my mission report." Unlike Orloff's itchy trigger finger—they were still a team.

"Surely you aren't so politically naive as to think I will be punished?"

"*The* Doctor Chan? Of course not."

"I'm sorry you feel hostile. What I did was necessary, and turned out tremendously well."

Kerry raised an eyebrow. "You think this one act of polyp goodwill is going to convince everyone that they want peace? On top of their screwy reason? Who's being naive now?"

"True, it will be a long, cautious trail, but eventually the polyps will join the humanoid races in the community of worlds. Thanks to your decision."

Kerry turned back to his board so he didn't have to look at Doctor Chan. "No wonder you were able to figure out the polyps. You're like them. They gambled their race for a prize they could only imagine. You did the same with our three lives. You're as inhuman as they are."

"Am I? Do you really know why I did what I did?"

"I think that's pretty obvious."

"Don't bet on it, Captain." ■

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The girl in the attaché case

Unusual things come in ordinary packages . . .

by GARY ALAN RUSE

"Be a sport, Pamela! It won't hurt a bit. We promise!"

The curvy, brown-haired coed looked at them strangely. "You're crazy! Both of you!" she wailed.

"Remember—you said you'd help us demonstrate our physics project," Jerry Wescott said, then looked to his brother Larry for support.

"That's right, Pam," Larry confirmed, "you did."

"But that was before I found out what your project is!" The college girl backed a step closer to the door of the garage-turned-laboratory. "You're crazy!" she repeated. Jerry adjusted his horn-rimmed glasses. They were the only outward feature that distinguished him from his

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identical twin brother. Both wore blue jeans and striped polo shirts. "Now look, Pamela," he said. "Let's be reasonable about this. I'll explain it again. It's all very simple."

"Simple-*minded* is more like it," Pam asserted belligerently. "You want to dislocate my atoms, shoot them through space, and then try to put them together again. I don't know about you"—she sniffed—"but I like the way they're put together already."

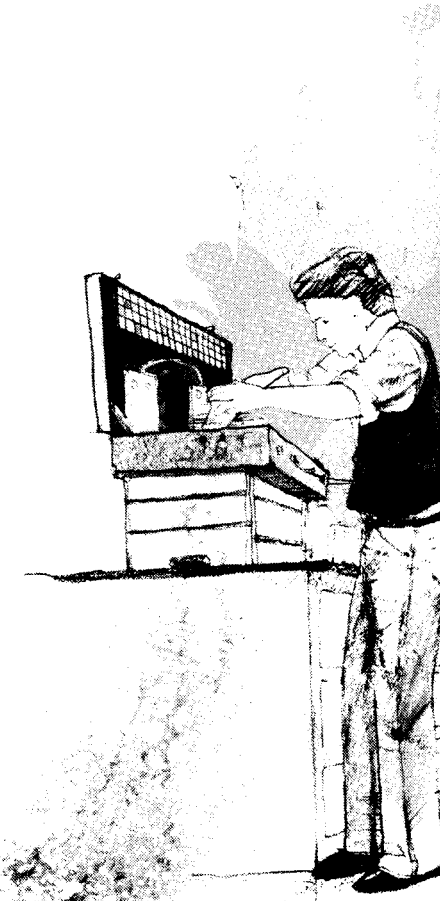
"So do we," Jerry assured her. "But you're worrying for nothing. Larry—get them out—"

Pam watched from a safe distance as Larry Wescott brought what appeared to be two large black attaché cases out from under the workbench. He set them flat upon the table before his brother, moving aside some of the clutter of papers and electronic gear.

"To begin with," Jerry explained, "this isn't just some run-of-the-mill matter transmitter theory. We don't have to break down your total mass into energy and then reconvert it at the end of the line. That's too risky."

"Oh, perish the thought!" Pam said with mock approval.

"What our system does is *true* teleportation—moving the desired object from one spot to another, but eliminating the distance in between. Like a



JEFFREY TERRESON

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dimensional gate," Jerry said proudly.

Pam straightened, hands on hips and eyes flashing. "Professor Freidkin says that's impossible."

"Professor Freidkin has strained bananas for brains," Larry Wescott said. "No good scientist ever rules out something as being impossible." He shrugged. "Highly unlikely, maybe, but never *impossible* . . ."

"Right," Jerry said, briefly removing his glasses to methodically polish them. "Which is exactly why we need your help. Freidkin will *never* take us seriously on our own. But with you, the best pupil in his physics class—he'll at least allow a demonstration."

Curiosity overcoming her fear, Pam edged closer to the table and the two attaché cases. "And your teleporter plans are stored in those?"

"No," Jerry said with an impish look. "Those *are* our teleporters."

"You're kidding."

In reply, Jerry flipped the latches on the case nearest him and opened the lid. Next to him, Larry Wescott did the same with his case. Inside both cases, the upper lids were crammed with micro-electronic circuitry and control buttons, some of which appeared to be liberated from old pocket calculators. The lower half of each case was totally taken up with a solid metal plate, the upper surface of which was dull gray.

"That looks like Teflon," Pam observed.

"It is," Jerry told her. "That's so you don't stick when you're going through." He flinched at her pained look. "Sorry—I couldn't resist the chance. Actually, it's a special alloy we've worked up for the transmission energizer plates. Both of them are molecularly 'in tune' with each other, and—"

Larry gave him an elbow in the ribs. "You don't have to give away *all* our secrets, dear brother. You're talking to the girl who maxed McPherson's chem exam last quinmester!"

"I trust her," Jerry said with a certain cavalier poise. "Anyway, perhaps a simple demonstration will serve best to allay her fears. Turn on your unit, Larry—"

Both brothers flipped the switches on their devices at almost the same moment. A distinct hum was audible.

"Now," said the bespectacled Jerry, picking up a tennis ball from among the table's items, "watch this!"

Holding the ball several feet above the teleporter before him, he released it directly over the metal plate whose surface was now fuzzy and indistinct. The ball dropped, behaving normally until it reached the surface. But instead of bouncing back, it merely disappeared into a gray haze.

Pam frowned hard at the spot where the ball vanished. Then in the next instant, it appeared in the *other* attaché case, popping straight up into the air with almost the same velocity with which it had been dropped.

Gravity pulled it back down again, and when it struck the energizer plate, the ball vanished a second time. *Pop,* it came up out of the first unit, then continued its performance, popping out of first one and then the other case.

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Pam watched with stone-hard features, only her eyes shifting to take in the ball as it alternately reappeared over each case. "Terrific," she said chillingly. "How long will it do that?"

"Oh, it will run out of momentum in a few minutes," Jerry told her. "But it does give you some idea of the potential, doesn't it—?"

Seeing she still looked unconvinced, Larry grabbed the ball the next time it came up out of his case and set it aside. "It's all perfectly safe for living tissue," he said, "if that's what you're worried about. *See—?*"

With that he thrust his hand directly into the attaché case, halfway up to the elbow. It too disappeared into the gray haze.

Suddenly sticking up out of *Jerry's* case was Larry's hand, fingers waving a cheery hello. Pam moaned and looked faintly ill. Then with a sudden change of heart she lunged toward them and the extended hand.

"Wait a minute—you're putting me on, right?" she said. "It's a trick table, and some kind of a phoney arm—"

She grabbed the extended hand and pulled sharply upward. Larry let out a sharp *oof* as his arm was jerked down into the other case clear up to the shoulder. Pam stared at the hand she was holding. It was warm and *very* real. She was about to let go when Larry tightened his own grip on her hand.

"Want to play games, do you?" he said, pulling back the other way. In a second he had extracted his own arm, at the expense of the girl, who was pulled partway into Jerry's attaché.

"Hey!" Pam protested, then looked over in astonishment as she noticed the delicate hand Larry was now gripping in the other case. Summoning up her courage, she wriggled her fingers on the hand that had disappeared from view. The fingers in the other case wriggled back at her. "Oh Lordy—that's *me*, isn't it!"

Larry released his grip, and as soon as Pam pulled free of the case she backed off, pinching and examining her arm as if afraid something dreadful had happened to it. Both brothers laughed faintly, then forced sober looks as she glared in their direction.

"All right, you've made your point," she said, a bit huffily. "But I don't see how you expect to transport a *whole* human being. All you've got is a small prototype."

Jerry adjusted his glasses somewhat self-consciously. "Granted, you're right on that count. A full-size model would be a lot easier to *walk* through. However, according to our calculations, you *will* be able to fit if you enter one of the cases either headfirst or feet-first. Bearing in mind, naturally, that you will be exiting in like manner at the other end of the line."

"Oh, sure," she said sarcastically. "Or you could just stand the cases on end and I could *crawl* through on my tummy!"

"Um, that would be workable, I suppose," Jerry said with dead seriousness, "but not terribly dramatic."

"And anyway," Pam continued, "what kind of range are you talking about? What distance can you have

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between these teleporters?"

"On these low-powered models," Larry answered, "only about a mile."

Pam considered it for a long moment, a frown of sober contemplation on her features. Finally, she said, "All things considered, if it only worked a distance of ten feet, it would still be an enormous accomplishment . . ."

"Then you'll do it?" Jerry asked.

"I suppose. Although it probably makes me as crazy as you two are." She looked down at her clothing—a tank top and denim short-shorts. "I'll have to wear something better than this, though."

"Fine, but keep it close fitting, or you'll never make it through."

"When do you want to set it up?"

"For this afternoon's class, if you can clear it with Professor Freidkin," Larry replied. He solemnly patted the now-closed top of his attaché case. "Man, I can hardly wait to see old Freidkin's face. We're going to make history at two o'clock . . ."

"Quarter to two," FBI agent Matt Nesbit commented dryly after checking his watch. "Do you think Zeppelli's men will show?"

Next to him in the gray four-door Chevy Nova, veteran agent Dan Gimbel peered through binoculars at the deserted bus stand on the edge of the university property. "They'll show. That's not what worries me."

Nesbit shifted uneasily in his seat, repositioning the black attaché case in his lap. "Think it could be a set-up?"

"Hard to say. But we've certainly fed him enough false information for him to think that you're a rival worth taking note of. He likes to think he's got the drug market cornered in this part of town." Gimbel paused a moment, taking the binoculars away from his eyes. "The way I figure it, he's either going to invite you into his organization or recommend a change of climate for your health. If you're lucky."

The younger agent indicated the attaché. "He did ask that I bring along sample merchandise. That sounds like he might want to do business."

"Or lull you into a false sense of security," Gimbel replied. "You *are* wearing your vest, I trust—?"

"Sure," Nesbit said, but patted his striped polo shirt for self-assurance. It was there, all right, the allegedly bullet-proof, many-layered garment. "And it's plenty hot in this weather."

"Leave it off," Gimbel said with grim humor, "and you might end up air-conditioned."

Nesbit smiled wanly. "I just hope we can finally get something concrete on Zeppelli's New Jersey connections. I want to wrap up this case." He checked his watch and reached for the door handle. "I guess I'll get moving—"

Nesbit was half out of the car when Gimbel lunged for his sleeve. "Hold it! Somebody's over there."

Nesbit sat back down, looking in the direction of the bus stop. "Can you see who it is?"

"Nobody I've seen before," Gimbel said, peering through his binoculars. "Looks like a student."

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Nesbit fumed. "Well, what's he doing there *now?* I picked this time because the next bus isn't due for forty-five minutes."

"Tying his shoe," Gimbel said. "The kid's tying his shoe. And he's got an attaché case that's a dead ringer for the one you're carrying."

Nesbit fidgeted. "Get out of there, stupid," he said under his breath. "Before things start going down."

At the bus bench, Larry Wescott finished lacing up his Earth shoe. He glanced up to get his bearings and smiled faintly to himself as he saw the Science Building. Zero hour was almost here, he thought with delicious anticipation, and old Freidkin was going to swallow his dentures for sure. Larry started toward the building, got three steps away from the bus bench, then turned in alarm as the squall of tires sounded behind him.

The big black Cadillac looked like a tank bearing down on him. It swerved narrowly enough to miss, but as it slammed to a hasty halt alongside of him, the rear door swung open and two beefy characters in dark business suits piled out.

"Hey, what's the—" Larry got out before a large hand clamped down over his mouth and he was hauled into the waiting car. In another instant the door slammed shut and the big Caddy left ruts in the parkway as it peeled away.

In the FBI stakeout car, Gimbel threw down his binoculars and started the engine. "I got the license," he snapped. "Alert the other cars."

Nesbit grabbed for the radio microphone as the car lurched forward. "What are we going to do?"

"What do you think? We're going to follow them and get that jer—ah, citizen free before anything worse happens." Gimbel shook his head as he angled down the road. "Shoot! Kidnapping isn't the kind of a bust I wanted to make . . . ."

"I feel silly!"

"Nonsense!" Jerry told her. "Just remember—this is all in the cause of science."

Pam took a deep breath, rolled her eyes once, then slipped out of the light cloth raincoat that had enabled her to reach the university library inconspicuously. Even in the deserted maintenance room she felt embarrassed. If she had blushed, it would have matched her outfit.

Red boots. Red leotard. Red sash at the waist. The only part of the outfit that *wasn't* red was the big white lightning bolt that zig-zagged diagonally across the front of her torso.

"Are you sure this is necessary?" she asked, fingering the impromptu bolt that had been hastily stitched to her old modern dance suit.

"Of course! This is a big deal, Pam. You want to make history in blue jeans?"

"No, but surely something a little less *flashy*—"

Jerry made an expansive gesture with his hands. "Just a little razzle-dazzle for effect. These days you have to be dramatic to capture people's attention. And the news media—well,

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they won't even give you a second thought unless—"

"News media!" Pam interrupted. *"You invited reporters?"*

Jerry backed away from the suddenly aggressive girl. "Not a lot of them," he said quickly. "Just a mini-cam crew from one of the local TV stations."

"Television!" Pam indicated her outfit with a sweeping hand. "You want me to appear on *television* dressed like this?"

He shrugged weakly. "Looks fine to me." Under the pressure of her withering glare he added, "Well look, I couldn't give them details of the project beforehand, so I *had* to at least promise them something colorful. You do understand, don't you? I mean, you wouldn't back out on us now."

"Wanna bet!"

As she turned and headed back for her raincoat, Jerry followed. "Aw, please, Pam. This is important!"

She whirled to face him. "Maybe. But you haven't been playing straight with me, Jerry. You should've told me from the start what you had in mind."

"If I had, would you have agreed?"

"I don't know. But you should have told me."

Jerry looked shamefaced. "Yeah, I guess you're right. But we really do need your help. We didn't want just *anybody* doing it."

"I'm deeply touched," she retorted. After a long moment, she said, "All right. I'll help. I'll even wear this freaky outfit. But this is the way it's gonna be—I want in on it."

"In on it?"

"You heard me. You're sitting on a big invention that's probably going to revolutionize the world. And you're going to need help developing it. *My* help. You can't deny I'm qualified."

"You're qualified, all right. Scientifically conservative, but qualified," Jerry replied. "Those are your terms?"

Pam nodded. "Take it or leave it."

"Do I have any choice?" He looked at his watch. "It's almost time! All right, you're in the partnership. But let's get the show on the road!"

Pam gave herself the once-over, straightening a few seams. "I still think we should have gone with Larry and set up over in the science building."

"That would have been too close—a jump from over here will be more impressive." He opened his attaché case and set it on the floor. Switching the device on, he then stepped up on a crate and motioned for Pam. "Come on—when the indicator light goes on, we'll know Larry has his device ready."

Still fuming, Pam stepped up beside him on the crate. "You just make sure you steady me. I don't want to go diving in crooked and hurt myself."

"Don't worry—you'll do fine." He supervised as she bent at the waist, arms outstretched as she poised above the energizer plate of the teleporter. "Just remember—the camera will be on, so give them a little show-biz when you pop into view."

"I'll do my best." Cocking her head to one side as a thought occurred to her, she asked, "Hey—what would happen if I were to jump in before Larry had *his* gadget turned on?"

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"Nothing bad," Jerry assured her. "You'd just have to kill a little time in zero-space . . . sort of like being put on hold."

"Terrific . . . ."

"Here he is," Louie the Thumb announced as he and his fellow henchman hauled Larry Wescott into Alfredo Zeppelli's posh penthouse office suite. "The punk and his merchandise."

Zeppelli sat gazing out the window at the distant horizon for a moment, then slowly turned in their direction. "Ah yes, the enterprising young man who's trying to move in on my territory."

"I don't know what you're talking about," Larry protested. "I was just walking along minding my own business when all of a sudden—"

Louie the Thumb took a handful of Larry's shirt and raised him almost off his toes. "You talk when the boss asks you a question. I didn't hear the boss ask you any questions, punk."

Zeppelli smiled with all the sincerity of a python. "Don't you think it's a little late to back down? You already agreed to this meeting, didn't you?"

"You must have somebody else in mind," Larry said quickly, glancing at Louie defensively. "I'm Larry Wescott. I'm a student at the university."

"Oh, come now," Zeppelli chided. "You were there at the predesignated meeting place at the right time, you were wearing what our contact told us you'd be wearing, and you have the sample merchandise we requested. Let's not be coy."

"But—" Larry started. Then under his breath to Louie he asked, "Was that a question?" When Louie shook his head negatively, he clammed up.

"Now," Zeppelli said, leaning forward and eyeing the attaché, "before we decide what to do with you, we may as well have a look at what you've brought us—"

Larry held the case protectively. "Now wait a minute! This isn't what you think it is . . . whatever it *is* you think it is."

"The boss only asks nicely *once*, punk:" Louie lifted him off his feet and brought him forward until he dangled in front of Zeppelli's desk. "Now give!"

Larry considered the logical alternatives for a moment, then reluctantly set the attaché down on the desk. He watched helplessly as Zeppelli unlatched it and raised the lid.

Frowning at the contents, Zeppelli said, "What *is* all this junk? Were you trying to pull a fast one on us?"

"It's like I told you! I'm just a student, and this is a, uh . . . a science project." Watching Zeppelli fiddle with the controls, he said anxiously, "Please don't touch anything."

"What's the matter. Afraid I might find out what you've got hidden in here—?"

Zeppelli's attention focused next on the power switch. With a casual flip of his hand, he turned it on. The distinct humming noise started up and everyone leaned closer to observe the source of the sound.

Sproing!

There was a sudden explosion of red

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as Pam popped straight up out of the attaché. She landed lightly in the center of the desk, hands extended out to her sides like a circus performer.

"Ta-daaa!" she said with a flourish, then her big smile faded as she took in the unfamiliar surroundings.

Zeppelli went over backwards in his chair. He scrambled out of the overturned seat and peered over the edge of the desk. "Son-of-a-gun—" he said under his breath, "—an instant broad!"

Pam was rapidly losing her self-confidence now. "Larry, where are the cameras?" Her gaze swept from Zeppelli to where Louie still gripped Larry by his shirt. "*Where's Professor Freidkin?*"

"It's this way," Larry explained apologetically. "I didn't quite make it to class."

Pam's eyes took in the drawn guns. "Oh well, that's okay, Larry." She shrugged, putting on a nervous grin as she turned toward the attaché. "Maybe I'd better go back and tell Jerry you'll be tied up for awhile—"

Zeppelli stood up and grabbed her arm, his composure returning quickly. "Hold it, honey. I think maybe you'd better stick around until we get an explanation!" Eyeing her up and down, he added, "Who are you supposed to be in that outfit, anyway—the Bionic Woman?"

Pam sighed. "I wish I were. . . ."

As the other underling came forward to take Pam into his charge, Zeppelli studied the attaché case with renewed interest. Reaching out a hand with some caution, he turned the power switch off, then back on again. He looked disappointed when nothing else popped out.

Glancing up to Larry, he said, "You really are some kind of science student, aren't you?"

"That's what I tried to tell you."

"Yeah, well, we were expecting someone else." His gaze drifted back to the attaché. "What is this thing?"

"Basically," Larry began reluctantly, "it's a teleporter, although we prefer to call it a portable module for interspacial translocation."

Zeppelli digested the answer for a moment, then said, "Yeah, sure. I can see that much. Ah, what does it *do*?"

"To put it in its simplest terms, you put something in this one and it comes out of another one just like it, somewhere else."

"With nothing in between?"

"That's right."

"How far?"

"About a mile," Larry replied. "But of course, it could be more. This one only works on batteries."

"Only works on batteries, he says." Zeppelli's eyes were gazing off into space as his mind contemplated the possibilities. He was no scientist, but he knew potential when he saw it.

"Say you had a more powerful one," he began speculatively, "located in someplace like, oh, say *Colombia*, just to pick a name out of a hat. And another here in town. You mean to say that one of my business associates down there could just put a parcel of merchandise in, and it would pop out up here?"

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"Oh yes," Larry said proudly. "We figure there are a lot of business applications."

"Think of it, boys," Zeppelli said with growing enthusiasm. "No exorbitant transportation costs...no problems with customs checks or border patrols...and instantaneous delivery!" He motioned for Louie to release his hold on Larry's shirt. "Yes, indeed. I think we've got some business to discuss...."

Jerry Wescott slowed his pace as he reached room 330 in the Science Building. He hesitated before the door long enough to check his appearance and braced himself for the standing ovation he felt sure would greet him. With a modest grin of achievement he opened the door and entered the classroom.

What greeted him was a bored silence.

His fellow classmates were slouching at their desks, a few napping on their books. The television mini-cam crew were slumping in the back corner, checking their watches. The only movement came from Professor Freidkin's agitated pacing.

"You're late," Freidkin said irritably. "I should have expected the worst from the Wescott twins, I realize, but when *Pamela* asked me for time to display your little secret experiment, I figured you would at least be prompt!"

"Where's Larry?" Jerry asked with sudden concern.

"How should I know?" Freidkin asked. "For that matter, where's Pamela? She's certainly never been late before. Frankly, I think you boys are a bad influence on her—"

"But I sent her through!" Jerry hurried to the long display table in the physics classroom and set down his attaché case. "And she didn't come back, so she had to go somewhere!"

"Young man," Freidkin said, eyeing him strangely, "what on Earth are you talking about?"

Ignoring him, Jerry quickly opened up the teleporter and switched the circuits on. Leaning down toward the transmission energizer plate, he yelled, "*Pam—where are you*?"

Freidkin arched an eyebrow. Half the students in the room snickered. The camera team started to pack.

"Jerry—is that you?" Pam's voice issued faintly from the teleporter, then suddenly became muffled.

"I'd better take a look," Jerry announced. Leaning further over the attaché case's edge, he poked his head inside. There was a startled gasp as he sank down in past his shoulders. Freidkin gaped and the camera crew hastily got their gear back in working order.

The next instant, Jerry's body jerked slightly and his legs buckled. He slumped back out of the case and slid to the floor, a bump the size of a goose egg on the back of his head.

There was a scramble as Freidkin and several of the students rushed to Jerry's side. In the back, the television cameraman was fighting his way through the aisle to get closer to the action. All halted as a sudden shriek

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came from the open attaché. . . .

In Zeppelli's office, the second henchman regained his grip over Pam's mouth, a blackjack still ready in his free hand. "Hey, boss—maybe we oughta close that thing before somebody else sneaks up on us."

Larry Wescott was leaning away from Louie's grasp with an anxious look. "That was my brother! You didn't have to hit him."

"Your brother?" Zeppelli commented. "You mean there are two of you?"

At that moment, the door to the office was abruptly kicked in. An authoritative voice announced, "This is the FBI. Don't move. You're under arrest!"

Instantly both Louie and the other henchman released their grip on the two students and drew their guns. Unleashing a barrage of fire at the doorway, they positioned themselves behind the desk.

Agents Nesbit and Gimbel dived out of the way, taking cover. Staying low, they alternately appeared around the edge of the doorframe and returned the fire.

In the confusion, no one seemed to be paying attention at all to Pam and Larry. Pam grabbed the attaché off the desk and put it on the floor, then jumped quickly inside and vanished. Larry wasted no time and followed after her.

Zeppelli noticed Larry disappearing and whispered to his men, "Hey—we can get out of here! Keep them busy a minute. I'll go first. Then follow."

Zeppelli moved cautiously to the teleporter and stared inside, trying to penetrate the gray haze. After a moment's hesitation, he too climbed inside. It was a tight squeeze.

Silence fell over the room. Nesbit and Gimbel peered around the doorframe now that the gunfire had ceased.

"Hey," Nesbit whispered across to Gimbel, "I don't see them."

"Let's take a look," Gimbel returned. Cautiously, he eased himself around the doorframe and crawled into the room, keeping the big desk between him and the corner where Zeppelli's men had last been seen.

As he peeked around the corner of the desk he noticed the attaché. A foot was just withdrawing from view.

"Hurry—over here!" he called to Nesbit. "They've got some kind of a trapdoor."

Nesbit arrived to see Gimbel carefully shifting the attaché to one side. He looked bewildered. Solid floor was everywhere.

Gimbel frowned. "There's got to be a hole here somewhere!"

Nesbit watched for another minute. "You feeling all right?"

He looked around, caught the skeptical look in Nesbit's eyes. "No remarks! I *saw* a guy disappear through here. . .*somewhere*."

Nesbit still had a poker face. "Through there?"

"Yes! Right through there—" He jabbed a finger in the direction of the attaché and his hand disappeared into the gray haze. His eyes followed down

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the extent of his arm.

"Omigosh...!"

In room 330 of the Science Building, Jerry Wescott was coming around. However, Professor Freidkin was out cold. He had just gone over to study the curious device he had thought was a mere attaché case when Pam and Larry had popped out right before him, followed shortly thereafter by Zeppelli and his men.

Zeppelli was fighting his way through the panicky crowd of students, his arms shielding his face from the glare of the television lights, shouting at the top of his lungs, "*No comment, no comment!*"

His two henchmen were still trying to recapture Larry Wescott and Pam. Louie reached them just as Jerry approached, his glasses missing.

"All right, hold it, you—" He waved his gun menacingly at Larry, then with some confusion swung it around to take in Jerry as well. "Ah...*both* of you. I'll let the boss sort you out later."

"*Drop your guns!*"

The voice came from the still open attaché case. A very surprised looking agent Gimbel was peering out, his service revolver poking up over the edge of the case.

Louie and the other man hesitated for a moment, then dove left and right, losing themselves in the turmoil. Gimbel wasted no time in climbing out. He shouted back into the attaché for reinforcements and quickly took cover behind Freidkin's podium.

FBI agents started tumbling out of the attaché in their gray suits, looking like some kind of corporate gymnastic act. One of them had made the mistake of jumping into the transmitting case feetfirst, and popped into view upside down. He did a spiraling flip and landed flat on the floor, grunting loudly as the next agent to emerge stepped on his stomach.

As the FBI men fanned out across the front of the classroom, Zeppelli's henchmen took positions near the rear and opened fire. Students shrieked and hit the floor, staying low as bullets whizzed overhead in both directions.

Off to one side, the cameraman peeked over a seat with his unit, trying to cover the action. The station's reporter was crawling alligator fashion around in front of the camera, a microphone held in his teeth.

"Have we got audio—?" he whispered as he got in position, straightening his tie. When the crew gave him the signal, he raised himself into view. "Ahem..." he addressed the camera. "Quite unexpectedly today, a raging gun battle erupted in the ordinarily sedate setting of a college physics classroom, apparently between law enforcement officers and—"

A ricochet whizzed past, neatly severing the cable a few inches below the microphone. The reporter looked at the cut end, turned pale and melted back down out of range.

At the rear of the room, Zeppelli conferred with his subordinates behind the semicircle of student desks they had formed. The two gunmen

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popped up periodically, taking shots at the FBI agents.

Ducking back down, Louie said, "We've got to get out of here, boss."

"No fooling!" Zeppelli stayed low. "But even if we *can* get out of here, it will take cash to leave town, and that's all locked up in the office."

Zeppelli fell silent for a moment, considering his options. The situation might not be as clear-cut as it seemed. A kidnapping charge might not hold. After all, he certainly didn't tell his men to pick up a college student. So he really didn't order the kidnapping that actually took place! For that matter, he was not absolutely certain the FBI men had gotten a good look at him when they kicked in the door of his office.

One thing *was* certain. If he stayed here in the classroom he *would* be arrested, and probably charged as an accessory to the shooting spree. If he could just get back to his office, sneak out the back way and contact his lawyer, he could work something out. Or, just grab his ready cash and split.

"See if you can keep them busy," Zeppelli said at last, trying to hide the smile that threatened to form as he contemplated his escape. "I'll, ah... I'll see if I can find us a way out of here—"

Jerry, Larry and Pam were huddled at the far side of the room. They were surprised when Zeppelli crept up alongside of them, brandishing a small automatic.

"OK, hotshot. You—" he said softly, gesturing at Jerry, then settling inexplicably on Larry instead, "—no, *you* are going to do a little job for me."

Larry Wescott gazed down the barrel of the small weapon and swallowed hard. "What kind of job?"

"Very easy. I want you to go over to that gadget of yours. Preferably without the Feds noticing. Then I want you to check and see if my office is clear—I assume the connection is still set up between there and here?"

Larry shrugged. "The equipment's still on."

"Go to it then." Zeppelli waved his gun for emphasis, in the direction of Jerry and Pam. "And remember that I've got your friends here."

Larry nodded and left them, working his way around the edge of the room toward the table where the attaché case still rested. Staying low, he waited until the FBI agents seemed too busy to glance in his direction. Then he carefully reached up over the edge of the table and brought the case down to floor level.

Cautiously, he peeked into the gray haze, his head disappearing from view. A moment later, he was on his way back. When he reached Zeppelli and the others, he was silent.

"Well?" Zeppelli frowned. "Is it clear? Are there any cops in my office now?"

"I didn't see *anybody* in your office," Larry told him.

Zeppelli eyed him suspiciously. "Are you sure?"

"I'm telling the truth."

"Good. Then all I need is the right moment."

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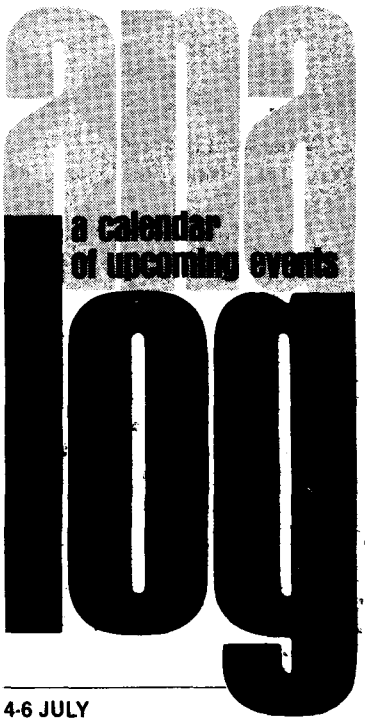

4-6 JULY
WESTERCON 33 (West Coast SF conference) at Hyatt Hotel, Los Angeles, Cal. Guests of Honor—Roger Zelazny and Bob Vardeman. Registration $20. Info: Westercon 33, P.O. Box 2009, Van Nuys CA 91404.

4-6 JULY
EMPIRICON 2 (New York area SF conference) at Prince George Hotel, N.Y.C. Guest of Honor—David G. Hartwell, Fan Guest of Honor—Marc S. Glasser. Registration $9. $1 extra for Diplomacy Tournament. (Checks payable to T.E.S.S.F.A.) Info: Box 682, Church St. Station, New York, NY 10008.

4-6 JULY
MYSTICON (Virginia SF conference) at Sheraton Red Lion Inn, Blacksburg, Va. Guest of Honor—Gordon R. Dickson. Registration $5. Info: Mysticon, P.O. Box 12294, Roanoke VA 24024.

4-7 JULY
UNICON 80 (SF conference) at Keele Univ., Staffordshire, England. Guest of Honor—Harry Harrison, SF Artist Guest of Honor—Dave de Leuw, Fan Guest of Honor—Peter Roberts, Fan Artist—Ashley Walker. Registration £4.50 in advance, £5.00 at the door. Info: UNICON 80, P.O. Box 92, Derby DE1, 1AP, England, U.K.

11-13 JULY
ARCHON 4 (St. Louis SF conference) at Chase Park Plaza St. Louis, Mo. Guests of Honor—Robert Bloch and Wilson Tucker, Toastmaster—Ed Bryant. Registration $10, $4 supporting. Info: Archon 4, Box 15852, Overland, MO 63114.

18-20 JULY
OKON (Oklahoma SF conference) at Tulsa, Okla. Guest of Honor—Alan Dean Foster, Fan Guests of Honor—Shelby Bush III, Mary Kay Jackson, Toastmaster—Gordon R. Dickson. Registration $9. Info: OKon, P.O. Box 4229, Tulsa OK 74104.

29 AUGUST-1 SEPTEMBER
NOREASCON TWO (38th World Science Fiction Convention) at Sheraton-Boston Hotel and Hynes Civic Auditorium, Boston, Masstts. Guests of Honor—Kate Wilhelm and Damon Knight, Fan Guest of Honor—Bruce Pelz, Toastmaster—Bob Silverberg. Registration $30 until 1 July 1980, nonattending membership $8 at all times. Registration $45 at the door. This is the SF universe's annual get-together. Join now and get to vote for the Hugo awards and the John W. Campbell Award for best New Writer. Info: Noreascon 2, P.O. Box 46, MIT Branch Post Office, Cambridge MA 02139.

ANTHONY LEWIS

Items for the Calendar should be sent to the Editorial Offices, ***four months*** *in advance of the issue in which you want the item to appear.*

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Zeppelli did not have long to wait. Before ten minutes had elapsed, both of his subordinates had exhausted their ammunition. He watched from a safe position as their hands went up in the air, both men surrendering.

The FBI agents moved cautiously toward them to make the arrest. When they reached a point a little past the center of the room, Zeppelli tucked his pistol away and prepared to make his move.

Their backs toward him, Zeppelli jumped to his feet and dashed for the front of the classroom and the attaché, legs pumping like an Olympic sprinter. He gave not a backward glance toward his men. They had done their job, and there was no sense in going down the drain with them.

With an eagerness that overcame all caution, Zeppelli dove headlong into the attaché case, vanishing into the gray haze. Passing through, he sprang out of the other case and landed somewhat awkwardly, almost turning an ankle as his foot sank down into an unexpectedly soft floor.

Something was wrong! Besides the insubstantial floor, the office was unexpectedly dark. Or *was* it his office? Zeppelli peered around in the dimly lit interior, trying to make out any familiar details.

There was a lingering smell of old, burnt gunpowder. And when Zeppelli put out his hands to probe the space around him, they encountered walls, close in each direction. Walls padded with thick, chunky material, pitted with holes, some of which were filled with debris. He continued to probe.

As his eyes got used to the semi-darkness, he glanced up, becoming aware of a small opening only a few feet above his head. A gray, overcast sky was visible through the opening.

Something else was visible, too. An alien looking figure garbed in bulky clothing and wearing a face-obscuring helmet was leaning over the opening, looking back at him....

Meanwhile, in room 330 of the Science Building, Gimbel and Nesbit were standing next to the Wescott twins, looking very disturbed.

"All right," Gimbel was saying. "I still don't know what in blazes is going on here, but I think you people just helped one of our suspects escape! Now are you going to turn your device back on and let us follow him, or not—?"

"Don't worry," Larry Wescott said, "he didn't escape, exactly. Why, I imagine some of your associates already have him in handcuffs."

Now it was Jerry Wescott's turn to look confused. "But I thought you told him there weren't any police there."

"No. What I told him was that *I didn't see anyone in his office*." Larry smiled broadly. "Which is true, because our other case is no longer *in* his office."

Nesbit frowned. "What are you talking about?"

At that moment, Gimbel reached for his belt as his small radio unit buzzed. "Gimbel here—"

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"This is agent Whittaker," the voice from the radio responded. "I just arrived here at the office building you directed us to, and, well, I don't know exactly how to put this."

Gimbel frowned, glancing up in Larry's direction. "Get to the point, Whittaker. What's happened?"

"Well, it's this way," the voice continued. "At least, this is the story I got from the local police, who arrived here a little before I did." He paused a moment, perhaps to check his notes. "Now, as I understand it, when you and your men went into Zeppelli's office building with your guns drawn, somebody here got all excited and called the phone operator, who apparently was a new girl, who got excited. By the time the message got relayed to the police, they didn't know *what* was coming down but figured it was something big. So they scrambled just about everything they had, including the SWAT team and the bomb squad..."

There was a momentary break in the transmission and Gimbel said, "Yes—go on—"

"Well, according to the officer in charge, when the police arrived in Zeppelli's office, they couldn't find anybody at all. At first they thought maybe the whole thing was some kind of a hoax. Then they found it."

"Found *what*?"

"An attaché case with lot of weird stuff in it, humming like mad. Heck, they figured why take a chance...let the bomb disposal team handle it. So one of their guys in blast armor carried it out of the building and tossed it into their mobile bomb tank. Nothing happened. But about ten minutes later —and this is where it gets *really* hairy—about ten minutes later one of the bomb disposal men peeks inside to see what's cooking, and there sits *Zeppelli* on the floor of the tank, babbling incoherently. Does that make any sense to you at all?"

"Yeah," Gimbel transmitted back. "At least, about as much sense as anything else in this case so far. Thanks, Whittaker. Take Zeppelli in and hold him until I get there."

"Right. Out—"

Gimbel put away the radio, glancing over to where the other FBI agents were waiting with Zeppelli's henchmen in handcuffs. He looked back to Jerry and Larry Wescott, his eyes diverted briefly to take in Pam's bizarre outfit. He shook his head slowly, drawing in a deep breath.

"You three have some explaining to do, and I'm pretty sure the government is going to want to know more about that gadget of yours."

"Yes, of course," Jerry Wescott said with sudden inspiration. "We've only been considering the *business* applications. When I think of the possibilities in the national security field—!"

"Later, Jerry," Larry Wescott told him. "For now let's just be glad everything turned out well, and they got their arrest. That wraps it up, I guess," he said with a broad grin as he slammed the lid on the attaché. "Case closed...!" ■

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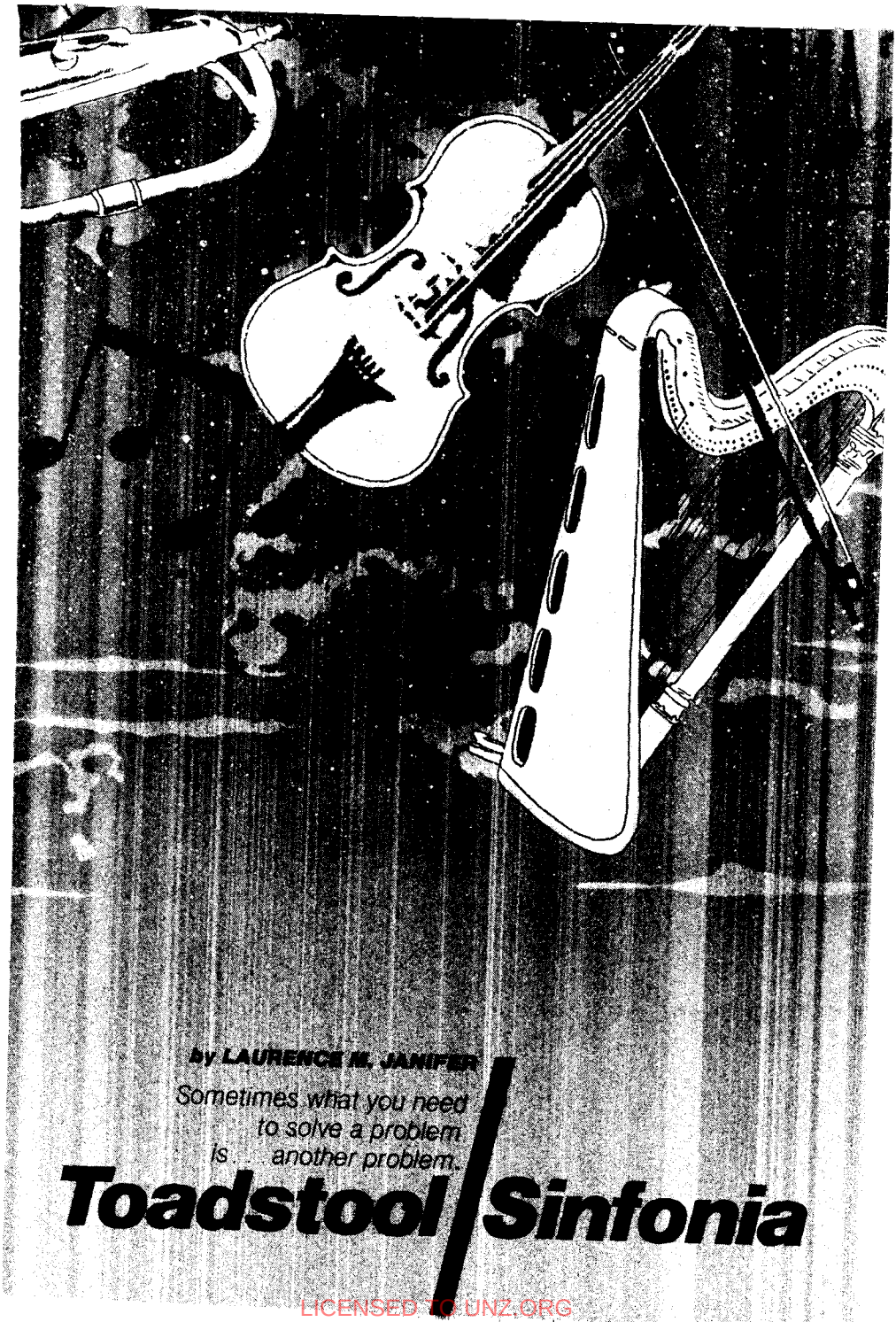

by LAURENCE M. JANIFER

Sometimes what you need to solve a problem is another problem.

Toadstool Sinfonia

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Under normal circumstances—strange as it sounds—I really don't like killing people. Death, as somebody or other has said, is so final; and, though the usual picture of a survivor is the 3V sort of thing—beamers blazing, swords and axes, slug guns, and a pile of corpses around finale time that includes most of the available cast—a survivor is primarily an information collector. Surviving is being able to lay your hand on the right fact when needed, and since you will never know what the right fact is until the need arrives, you look, and you listen, and you keep yourself informed. There is comparatively little information to be gotten out of a dead man. Killing people, you might say, is not my thing.

Of course, there are exceptions.

Equally of course, I don't spend all my time grimly Surviving, so to speak. My major aim in life is continuing that life, but what sort of life would it be, I ask you, if it weren't for the little things? The luxuries, the grace notes, the wonders of science and the marvels of art; when I have time, and I can usually make some, I gather just as many rosebuds as I can.

Though even rosebuds, I've discovered, have their troubles now and then.

One afternoon, for instance, on Apelles—ever heard of Apelles, by the way? Probably not. It's an out-of-the-way planet, classified as a frontier world but a long way from rude huts and alien savages. Apelles is about twenty percent artists' colony, which is a fantastically high ratio; the rest of the world is pretty much like your average, dull, urban nightmare, but the place has six symphony orchestras—live music, purely-by-hand instruments, not an electric circuit in a carload—fifteen book publishers, a wearying number of art galleries and the painters and sculptors to match—well, you get the idea.

So, one afternoon, I was sitting poolside in the very luxurious Apelles Hotel Dome, and listening to a rosebud tell me her troubles.

Her name was Marietta Jink, and she had long hair the color of anybody's warmest midnight, a face like a large-eyed elf, and a figure I won't describe: statistics cannot do Marietta anything like justice, and if you think about her for a while you run out of adjectives. Definitely a rosebud, and a highly talented one—first-chair, second violin section at sixteen, concertmaster at eighteen, and full conductor of the Williamson Philharmonia not even two months past her twentieth birthday.

She'd spent a year as a conductor. The trouble was that she had very few hopes of spending a second year—at least, not with the Williamson.

"We're good," she said. "You know that, Knave—we're as good as any orchestra on Apelles, maybe better, and we outclass anything I've ever heard offplanet."

"Then you ought to be surviving without trouble," I said. We were drinking gimlets, as I recall, which are a sort of highly superior martini and lead to great sympathy and clarity of mind.

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"There may not be enough audiences for all the concerts on Apelles, but if you're that good—and you are, I caught your Strauss Memorial the other night—you ought to be drawing more than your share."

She took a cautious sip of the gimlet. Marietta distrusted all alcoholic confections; I think she felt they might sneak up on her and destroy her sense of timing. "We do," she said. "But audiences don't pay an orchestra's way; they never have. It takes funding—patrons, foundations, all that sort of thing. Any orchestra runs at a loss; it has to, it's a luxury item. Especially one like ours—Knave, do you know what violin strings cost these days?"

I didn't, so she told me. I turned pale.

"And that means I have to pay my string section enough to let them live, buy their own strings, maybe support a family and have a drink once in a while. It mounts up; live handmade music is getting more expensive every year, and we just can't afford it any more." She shook her head slowly.

I didn't suggest trading her hundred and forty-four musicians in on a couple of synthesizers; it isn't the same thing, and we both knew it. "Well, what about Williamson?" I said. "The original grant should have been enough to—"

"To run an orchestra for fifty years," Marietta said, and took a slightly larger sip of gimlet. I was stretched out toasting myself in the artificial Sol that overhung the AHD pool. Marietta was sort of scrunched up in a deck chair next to me, shaking her head and looking miserable. Skin the color of very good coffee with a fair dose of authentic top cream; in that light, a sheen that made her look softer than any human being has a right to look. Unquestionably a rosebud among rosebuds.

"And it didn't?" I said helpfully.

"I tell you, Knave," she said, "everything's going up. When the orchestra was funded, prices were—oh, maybe a third of what they are now. And the fund was invested and paying a solid eight percent. Now—after fifteen years—the investment is paying six and a half, and prices have just about tripled."

I sighed. I stretched a little, and finished my gimlet, and shook my own head. "And Williamson wouldn't—no, of course not."

"Maybe he would have," she said. "Maybe he would have topped off the fund with enough more so we could survive until things even out. Maybe—if he hadn't gone off his own roof two weeks ago. You heard about that one?"

"I heard," I said. "Went into the files as an accident. I gather his investments weren't even doing as well as the orchestra's."

"These days?" she said. "You'd think that by this time somebody would have figured out what causes depression cycles—I mean, there's supposed to be a science of Socioeconomic Statics—"

"Give it time," I said. "In the long run—"

"In the long run," Marietta said,

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"the orchestra will be gone, and I'll be gone with it. There aren't many odd jobs for out-of-work symphonists these days, even if I wanted to go back to the violin—which I don't. I might get an occasional guest date—I might even manage to hang on, one way or another, until we even out, two or three years from now—but it isn't the same. The Williamson—God damn it, Knave, the Williamson is a fine orchestra, and Tarn Williamson was a fine man, and I'm not going to let it happen. We're going to survive."

I mean, Marietta never swore, but never. "Admirable," I said and meant. "How?"

"Well," she began, and stared for a minute, and then let her breath out in one long final sigh. "The practical man," she said a little wryly. "With the practical question. To which there is, very simply, not an answer in the world. Knave, I don't *know* how—but it isn't fair. It—just—isn't—"

I got up. Marietta was about ready to take in the rest of her gimlet, glass and all—that or go into the pool with it and forget she'd ever learned to swim.

I went to the chair where I'd hung my robe, fished around in a pocket, and pulled out a card. I handed it to her while she was still building up steam, and she stopped, and looked at it, and looked back up at me.

"What is this?" she asked me. Her voice was uneven.

"Business card," I said. "Mine. You may have seen them before."

"Damn it, Knave—" Twice in one day; this was a very, very troubled sample of rosebud. "Of course I've seen them before. *Gerald Knave: Survivor.* What does your card have to do with me—with any of this?"

I looked at her confidently. It's a look I do rather well. "I just wanted to remind you, 'Ette—that's my profession. Surviving." She was still staring at me. "And if a deserving organization like the Williamson needs to survive—well, that might be where I come in."

She blinked. She finished her gimlet. "Now, wait a minute," she said. "You really mean to tell me—"

"The orchestra will survive," I said. "You have a professional's word on it." I thought of a detail. "By the way—let's call it the next three years—how much would you need to survive? Counting everything—musicians, staff, hall, copyists, the whole charge."

She told me. I turned pale again. She gave me a crooked smile. "A little too much, Knave?" she asked me.

I gave her the confident look again. "Don't give it a thought," I said. "I told you I'd manage it. So I'll manage it. All right?"

"Knave," she said, "if you really could—"

"Of course I can," I said. "My professional word."

And in all this, I tell you with complete honesty, I had no notion whatever of the way things were going to go. All I knew was that, if I looked around, something would turn up—it usually does.

This time, I began to see, it would have to be a fairly sizable something. But, after all, there were a lot of places

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to look. And something would turn up.

On a backwater frontier planet during a depression....

I told myself to Think Positively. Somewhere, by God, there had to be something I could use ....

And I had not even heard, as of that date, of Helliman Ulg, or Pram Island —or the Thought Machine.

It just goes to show you there is some truth in the old sayings. Don't ask for what you want, one of them goes. You might get it.

But—for Marietta, to begin with—what else could I do?

Never let your business interfere with your living. I try to follow that old saying, especially since I think I invented it, but it's easier when the business is wholly yours. The prospect of getting shot at, here and there, had not interfered noticeably with my enjoyment of whatever happened to be around.

The prospect of Marietta's collapse did. I was checked into the Apelles Hotel Dome, and I went on living there, toasting myself by the pool or roaming the Primitive Habitat (guaranteed safe, and a damn bore), eating and drinking as well as possible, looking and listening because that is what I do all the time. But I was searching for a way out of Marietta's difficulties, and nothing presented itself.

The AHD had a few well-to-do boarders, and one crone in particular, who seemed to be wearing most of the jewel collection of the Comity Agreement Museum, caught my eye; but even the most delicate lift would undoubtedly have resulted in shrieking publicity, and while I could certainly make an arrangement with a friendly fence offworld; I couldn't quite see Marietta accepting Tainted Money.

She wasn't the type, somehow.

Now, if I'd been able to persuade the crone to help support the Williamson orchestra...but art patronage was at a low ebb on Apelles. During a Depression some of the arts do exceedingly well—people buy paintings, for instance, the way they buy common stocks. But gifts to symphony orchestras don't *appreciate in value quite the same* way. A good sculptor or a good jeweler can coin money during a depression, and on Apelles quite a few of them were doing so. But musicians are more the starving type.

I did have one idea—totally illegal, very complicated and extremely hazardous. I got it after three solid days of mulling, and I didn't much like it; but I was on my way back to my room to do some of the final mulling and begin to get matters in order for it—I was actually in the elevator—when a total stranger tapped me on the shoulder and asked me if I were Gerald Knave.

Most people tap me on the arm. Most people are shorter than six feet. This one had my attention at once. It was a large elevator, and except for a small woman with blue hair and an unlikely-looking shedding dog we were alone in it. He almost made it seem crowded.

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He was nearly seven feet high. We'd gotten on together, down in the lobby, but I hadn't noticed him particularly—a rarity—being in a more or less brown study at the time. He had blond hair and a craggy face and skin the color of Dutch chocolate. He had blue eyes, for God's sake, and a build that reminded me of good statuary. He was wearing a kilt, a white polo shirt and sandals—the kilt was mostly green and tan, a clan I didn't recognize—and his voice sounded very smooth and very friendly.

The elevator came to a stop. "I'm Knave," I said. "And this is my floor."

"Please," he said, and put a hand on my shoulder. A very gentle hand, actually. "I'd rather like to talk to you. My colleagues and I have spent a good deal of money ensuring that this encounter would take place. Please, Mr. Knave: let us not waste it."

Nobody that size has a right to words and cadences like that. I let the elevator door close. "All right," I said, "where to?"

He gave me a smile that made me his friend for life; he had one of those smiles. Marietta had one, too; they're rare, but I can think of worse occupations for a lifetime than collecting them. "Why not my room?" he said. "Unless you distrust me? You have no way of knowing who I am, of course, or what I represent."

True, and trust is not my middle name. Somewhere in that last balanced set of sentences the little old lady and her hairy dog had gotten off. I hadn't even noticed. But I noticed now.

If he wanted something, he was very, very good. I thought it probable that he could break me in two if allowed; but I had no intention of allowing it, and he seemed much too relaxed for frenzied sport. It might be that he was legitimate, more or less, in which case I had the time to listen—anything might be contributory to the main problem, and I really did not like the idea I was beginning to arrange—and it might be that he had a small con of some sort going. In that case, accompanying him would be a distinct pleasure. If the con were big enough, it might solve Marietta's problem there and then.

Unfortunately, he was legitimate. Very.

Charles Hutson Bellemand MacDougal, no less: B.S., M.S., Ph. D., this and that and several of the other: full Professor of Molar and Molecular Field Physics (at the age of thirty-one) in Ravenal Scholarte, and don't tell me you haven't heard of Ravenal. People who couldn't point to Apelles if they were standing on its sun know all about Ravenal; there may not be a better collegium in the strict sciences anywhere inside the known galaxy.

He introduced himself, sort of diffidently, between the elevator and his room—a smaller room than mine, with not much view, and a good deal too crowded.

I didn't believe a word of it.

He nodded as if he'd expected that. Before he opened the door of that room he'd convinced me.

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He had the papers, of course; and any damnfool impostor would have the papers. He had the little oddments as well—a note addressed to him from the hotel, that sort of thing, stuck in his sporran. (A sporran, if you need to know, is what a Scotsman wears hanging from his kilt. If you wear a kilt, and you're not a Scotsman, you still wear a sporran; a kilt has no pockets.) And anyone would've had the little oddments.

The thing was, it never seemed to occur to him that I might doubt all the nice documentation. *He* knew who he was, and the papers backed him up—and that was that.

Nobody, but nobody, is as good as that. Not to—pardon the phrase—the educated, professional eye.

I said: "Doctor MacDougal, I'm happy to meet you. Let's go."

He put a hand on the door panel. "Call me Mac," he said, turning back and giving me a smaller version of one of those smiles.

I felt as if I'd had two more gimlets, too fast. "Knave," I said. He nodded.

"Come in, Knave," he said. "There are a lot of people who want to talk to you."

There were: altogether too many. After about two minutes I climbed up on a table and waved my arms and called a halt.

The six or seven people who had been talking subsided. I looked around the room.

They came in all shapes and sizes. MacDougal was the largest, thank God. The others ranged from Evelina Dedrick, legal secretary and respected amateur in psychological mathematics, who was less than eighty pounds all told, with straw hair and bright, black eyes in an aging, paling face, to Fenner Muller Gabston, an inch or so taller than I was and perhaps two hundred pounds heavier. Gabston was a distinct surprise; I'd thought he was back in the Comity Worlds, probably on Earth itself. He'd won his Nobel Prize there—not socioeconomic statics, but psychological statics, a slightly more advanced field—and he didn't look the type to travel.

He looked as if you'd have to arrange a small hoist to get him aboard anything from a ground car on up. He wore preSpace Earth clothing, a tweed suit with a vest, and he was covered with cigar ashes. He was smoking one every time I saw him, and he had large gestures.

An expansive sort. A likeable guy, in fact.

They were all likeable, damn it; I felt as if I'd joined a good club. But it was still impossible to make any sense out of them if they all insisted on talking at once.

I had them quieted down. I stayed on the table, looking down at the crowded mob. Everyone was supplied with things to drink and smoke. I'd had a glass put in my hand within fifteen seconds after the door had opened.

I'd also had my back slapped eight

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separate times. Well, you always have to put up with something from your friends.

They were all looking at me with respectful attention.

"All right, now," I said. "Dr. MacDougal here tells me that—"

"Mac," he said.

I gave him a grin. I hope it did for him what his had been doing for me. "Mac," I said. "All right. Mac wants me here so that you can tell me something. But you can't all tell me at once. Can we take turns, or choose up sides, or how do you want to work it?"

Fenner Muller Gabston made a rumbling noise. "Quite true," he said. "We must extend our apologies. But there is not much time. Ulg is not likely to wait upon our decisions. Perhaps it is better if I explain the situation."

"All right," I said agreeably. Gabston had the full lecturer's manner, complete with frown and extra emphasis. But I thought he would probably know what he was talking about. "Go ahead. But begin with this: who is Ulg?"

"Helliman Ulg," Gabston said. It was the first time I'd ever heard the name. "But it is his line of research that is important, not his name. You see, Mr. Knave—"

"Knave," I said, to soften the manner down a bit.

He didn't soften. He gave me a tiny stiff bow. "Knave: very well," he said. "Now, you see, if the usual n-space conformal mapping of the human mind is taken as the sum of D and E throughout normal range, it is then obvious by Hiller's Theorem that a generalized summation can be made, to include any possible n-space grouping. Individuation of groups may still be derived from the whole result, but it is hardly necessary: the generalized grouping covers all possible states of the D and E variables throughout normal range. Outside normal range—let us say a summation for the same sets fully generalized—there are uncertainties, but it would be unwise to pin our hopes on such matters: the uncertainties, as it were, cover uncertain ground. And within the normal range there appears to be no doubt: such a summation will give such results."

He stopped, exactly as if he'd said something.

I shut my eyes for a second. I do have a vague background in mathematics—physics, mostly—just enough to tell me that I had no idea whatever what Gabston was getting at. The room had started up with murmurs—apparently arguing about summations outside normal limits, or possibly the variables D and E, whatever they were.

I opened my eyes. I picked out Mac, and then looked round for little Evelina Dedrick instead. "Miss Dedrick—" I began.

"Ms.," she said.

Oh, God, a religious nut. Well, some of my best friends, as the saying goes; and there are a lot stranger religions going the rounds than FemLib. "Sorry," I said. "Ms.

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Dedrick: can you put any of that into language an ordinary layman might understand?"

"Layperson," she said.

I suppose she said *herstory*, too. And *personhole*. And her shoes undoubtedly had soles and sheels. Intelligence has no reliable correlation (as Gabston might have said) with sanity.

"All right: layperson," I said. And I'd picked her because she looked small and bright and helpful. "How about it?"

She thought for a second. Her nose wrinkled when she did that. I wouldn't have mentioned it for the world; she'd have mistaken it for a pass. "What Dr. Gabston means," she said at last, "is that it is possible, in theory, to derive an abstract single group of functions applicable to any and all human minds. Molar and molecular activity can be detected, and imposed."

I felt stupid. I'd recognized Dedrick, Gabston and two others from 3V or paper news here and there; it was an assemblage of giant intellects. And they had to be reduced to putting everything into words of one syllable, more or less, in order to communicate with their guest—me.

On the other hand, I hadn't asked them for help; they asked me.

I felt a little better, but not much. I said: "Sorry. Can you go over that once more, please? I gather that it has something to do with mentation—"

"Persontation," she said stiffly. "Indeed it does, Mr. Knave. It has to do with the activity of every brain in this room—every brain on Apelles—eventually, every brain in the galaxy."

"Fine," I said. "And what does it have to do with all that?"

MacDougal broke in. He sounded helpful and mildly apologetic; well, her religious beliefs weren't his fault.

"Thought control," he said.

Sounded like something off the 3V.

"No, Mr. Knave," the Dedrick person assured me, "it is not some simple drama. Ulg has done the work—a method of true control now exists—or soon will, unless he is stopped."

I'd come down off the table. I was sitting in a chair with my drink—which turned out to be weak Frontier Scotch and ice-water. I sipped at it now and then to reassure my hosts. Dedrick, Gabston, MacDougal and some others were gathered around, some sitting, some standing. MacDougal was cross-legged on the floor, looking even larger than I remembered him.

"You mean—this Ulg person can take over your mind? Any mind?"

"All minds within range," she said tartly. "And the range is sufficient to cover Apelles. Then other machines might be built—"

"It's been inevitable, really, ever since psychology became a strict science," MacDougal said. Dedrick looked annoyed at the interruption, but let it go. "Sooner or later, somebody was going to come up with a set of field equations that meant something."

"But if Ulg—well, to begin with, how do you know what he's done?"

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That turned out to be an interesting story, if you have a strong stomach.

Helliman Ulg had been a researcher dividing his attention between the seminars Mac was giving and the Gabston scholium. Nobody had kept very close track of him for a few years, during which time he'd gained a brilliancy prize or two and impressed himself on all and sundry as a fine example of exceptionally nasty personality characteristics.

Then, on the eve, apparently, of his being awarded a Professorship in psychological statics ("No one liked him," Mac said sadly, "but that sort of brilliance is hard to ignore"), he'd disappeared.

There were a lot of rumors, many of them beginning with Ulg's having been hit over the head, stabbed, beamed or otherwise gotten rid of by someone he'd irritated just once too often. But the rumor that stuck was the one involving Pram Island.

Theoretically, it was owned by the Apelles Corporation—which is what they called the planetary governing body when they weren't calling it the usual nasty names one calls such things. Actually, it was an uninhabited lump of nothing-much out in Apelles' major ocean, and there was a not-quite-obsolete Sovereign Title law on the Apelles books that dated from the real Frontier days.

Ulg (the rumor went) had gone to Pram Island, inhabited it for the requisite time, and was now a Sovereign State, immune to the laws of the Corporation. He had somehow gotten himself a large gang of workmen out there, and he was building a large, novel device.

Mac told me he'd gotten worried. Ulg had struck him as a type with unfortunate potentialities—that's how he put it. Mac was a very mild man. He'd chartered a small craft and flown over Pram Island.

The place was domed.

Not like the Apelles Hotel Dome, with a semitransparent temporary job for weather control and general pleasuring.

It's possible, these days, to run a fairly sophisticated analysis of an object from a fair distance—say, three miles. The dome really gave Mac the itch, and he came back with some equipment and ran one.

The thing was made of the same stuff they make starship hulls out of.

An atomic weapon would take care of it—it wasn't as thick as your average starship hull; couldn't be, or the island would have sunk under it—but nothing short of that. A standard beamer wouldn't even make it sparkle, and slugs from a slug gun, even my pet reconstructed .45 Magnum automatic, would just bounce off.

The rumor began to sound more and more plausible.

Mac, and a few friends—Dedrick signed on around that time, as did some others; Gabston and most of the offworlders came along later—made a habit of cruising the ocean here and there, not too near Pram Island and not too far.

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"No real problems," Mac said; "Ulg could make his own air, keep his own food and water supply, and never leave the dome. But there might be a little refuse, we thought. There might be something to give us a real lead on what the hell he was doing under there. We were reasonably sure it wasn't pleasant, and we had some ideas—but we wanted any facts we could get."

"Good," I said. My feeling exactly.

"Trouble was," Mac said, "the refuse we got wasn't exactly what we thought it might be."

It had been a body—a workman, electronics tech and molar mechanic, apparently judged dead and just shoved out of an opening in the dome for the ocean life to get rid of. His name had been Revere Tang, and despite appearances he hadn't quite been dead, not then. Good luck for Mac and crew; whether it was good luck for Tang I wouldn't care to say. In spite of everything that could be done, he died less than twenty-four hours later. They were able to help with the pain, some, at the end.

Tang had a story to tell, and he was determined to tell it. That interfered with most of the anaesthetics; he waved them off and did his job.

Ulg was building a thought control machine.

Tang hadn't realized it at first. He'd hired on like the others—he was a good tech, accomplished and ingenious, and Apelles was, as I've mentioned, going through a Depression—and gotten to Pram Island some time before the large dome went up.

After that, nobody got on, and nobody got off.

There were a few objections, and a few speeches from Ulg about duration-of-contract residence, and every possible facility, and relatives either already along or notified; and most of the workers went along. A job was a job; there weren't many.

And Ulg was paying high salaries.

("He'd never had the money," Dedrick broke in. "We had to research that. He was being backed—a few people who had a very vague idea of what he was after, and thought they could—in the phrase—'do business' with him. And a lot of the pay was simply marks on paper, too: he gave the workers credit books, but they were never going to get off Pram Island to cash them in. It was all very clear, when we got a look at it.")

It took a bright and ingenious man to figure out what Ulg was up to; he'd split up the work sixty different ways, and then split up the splits. But Tang managed it.

And when he got it through his head that Ulg was serious—that he was really going for total control of every mind on the planet, eventually every mind in the galaxy—he made his mistake.

He went to Ulg's cabin with a homemade beamer. (Personal weapons distinctly not allowed on Pram Island, except for Ulg, as it turned out, and a small force of hired bullies.)

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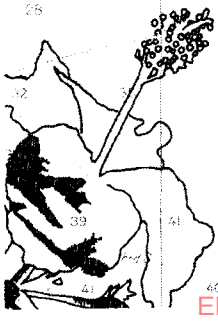

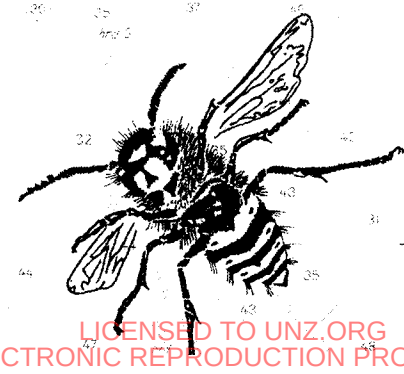

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Amateurs...well, the beamer was taken away. And Ulg asked him why he'd come with it.

Tang told him. Maybe he had some crazy idea that he could talk Ulg out of his plan.

Ulg, however, only nodded. He told his bully-boys to find out if Tang had talked to anybody else—or if he were representing a group of workers. Tang's sort of reluctance had to be stamped out, and if it meant hiring some more workers, opening the dome temporarily and letting them in, and shutting the dome again—well, what had to be, had to be.

The bully-boys tried their very best. That's the part that requires a strong stomach, since Tang was acting wholly on his own, and had been enough of a damn fool not to tell anyone else. Naturally, that statement couldn't just be believed.

They were enthusiasts.

I won't describe it. It went on for two days and three nights. At the end of it Tang should have been dead. He was dropped out of a temporary dome opening as if he were.

And—the big piece of luck for Mac and crew—he hadn't been, and he'd been found before he went under or otherwise succumbed.

The local-equivalent sharks had scarcely touched him. Tang had never noticed them, what with everything else.

He told his story—he did his job—and he died. God damn all amateurs; but Revere Tang rates a salute all his own. He did his job. A good many people don't.

And he wrapped up the picture for Mac and company.

The only remaining problem was what to do.

I stared at them. "My God," I said, "why ask me? Go to the Corporation. Tell them—"

"Sure," Mac said bitterly. "Look, Knave: you've had some odd experiences. Put it you're a little likelier than most to believe an odd story. Right?"

I sagged. "All right," I said. "And even I thought it was a bit wild. But you have the proofs—"

Mac gave me that gentle smile. He stood up, stretching. I leaned my neck back to keep the smile in focus until it left his face. "Proofs?" he said. "What, for instance?"

"Tang's story—the dome—Gabston can provide the background—"

I got that far and shut up. Tang was dead, and the dome was just a dome—go ahead, find out what's under it—and Gabston's background was going to be less intelligible to the Corporation than it had been to me.

"And the businessmen," Mac said. "Not many, but a few—actively backing Ulg, remember. They've got pressure to use. And if we start anything, they'll use it."

"But your reputations—all of you—"

"Oh, sure," Dedrick said. "All of us. Yes, indeed, Knave. Our reputations—our awards, our standing. After three or four years, they might

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mean something. They might tip the balance—after three or four years. I tell you, the crimes of this malefactor must be—"

"Personfactor," I said, and shut her up with it. A small but warming satisfaction. Mac very nearly smiled again; I could see him start, and decide that discretion was the better part of conspiracy.

"Well," I said into the silence, "how long have we got?"

"From what—Tang told us," Mac said evenly, "I'd say six months at the most."

"Four," a young woman said—a stick of a girl named Wilviria Spodin, I'd discovered, with a hell of a reputation in molar technology.

Mac nodded. "Four," he said. "And then—"

"And then," Dedrick said, "the dome opens, and the waves begin to spread—and in thirty minutes our minds are not our own. And never will be again."

"When the pie was opened..." I murmured, and found them staring at me. "Sorry," I said. "All right: four months. Then the Thought Machine starts up. So you drop a small atomic—barely tactical size, as they used to say—on Pram Island, and you argue it out with the Corporation later. My God, it doesn't take four months to make a tactical-size atomic bomb—and the knowledge to do it is right in this room."

"The money, too," Mac said. "We'd pay—well, any sum within reason—any sum within even inflated reason—to get that bomb. I don't like killing—"

"I don't either," I said. Dedrick stared at me.

"But you—"

"My reputation," I said. "Sure. But killing is not my sort of thing; honestly. If there were some other way—"

"There isn't," Mac said.

"Agreed," I said. "So you buy your equipment—Lord, what do you need but some nice U-235, a few tampers, a globe, beryllium reflectors, a fuse—and you go to work. Shouldn't take four months; shouldn't take two."

Mac nodded and looked sad. "Sure," he said. "We buy our U-235—where from, Knave? Do you know what Corporation inspection is like? Do you know how Ulg's pet businessmen have—"

"Businesspeople," Dedrick said. I'd wondered when she'd get around to it.

"Whatever they are," Mac said. "Do you know how they've beefed up that inspection? Radioactives in the hands of private citizens? Man, that's dangerous—Ulg knows the weakness of his dome as well as we do, probably better. And in general—"

"In general," I said, "you don't get U-235 into private hands. I agree. But—after all, a lot of you are major figures in science. Can't you mock up needs for your labs? Something—"

"Not enough," Mac said. "It's a difficult item to find an excuse for, and we need nearly three and a half

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pounds. We do have some, more than half of minimum need—but three and a half pounds is missing. We haven't got a halfway plausible story to requisition it, and we can't come up with one—unless you—"

I shook my head. "No such luck," I said. "That's a job I leave to the technical people; any story I dreamed up would have as many holes in it as you would like to put in Helliman Ulg."

"And if we draw suspicion to ourselves," he said, "the whole thing goes down the drain."

"That," Gabston chipped in heavily and cheerfully, "is why we greeted the news of your arrival on Apelles as a gift from the gods. An incredible piece of luck."

"Sure," I said.

"I may mention Haven II," he went on. "And Cub IV. And—"

"Spare my blushes," I said, lifting most of a damn graceful line from a preSpace author. "Whatever. You think I can do your job for you?"

"We think you can manage to get the U-235 out for us," Mac said. "We can do our own refining, on the spot—we've got a crew out there, and the richness of this ore is beyond belief; we can use a sort of beam analogue of zone-melting, and at nearly an eleven-to-one ratio—"

"All right," I said. "You can get it refined and ready to go, out of the natural ore. But you can't take it anywhere."

Mac looked at me earnestly. "We would pay any price—virtually any price. Believe me. But we need it here—in this city, where we can work with it—and we need it quickly. Knave, if anyone can do it—"

I looked them over. Mac, and Dedrick: a fair balance. Gabston the likeable, ashen with cigars. Wilviria Spodin—not my type, but why hold that against her? And all the others.

Including Revere Tang—of course including Revere Tang.

I sighed. Deeply. "I'll do your job for you," I said. "My professional word."

I had no idea how—the basic uranium mining sources from which they were going to refine out the needed isotope were five thousand miles around Apelles from where we were sitting, and any obvious hijacking would tip our hand. But—well, something would turn up, I told myself; something always does.

I wondered briefly where I'd been thinking that recently. I wondered, just as briefly, where I'd given my professional word on something.

Then I beamed all over my charming little face.

"It's going to cost you," I said. "Beyond the price of the metal, it's going to cost you like hell."

"Money is no object," Mac said. Nobody seemed to moan or faint. "If you can get us the metal—"

"Sure I can," I said. "I may need to ask you a couple of questions—"

"Anything," he said. "Anything at all, Knave. If you can really do this job for us—"

"Oh, I can do it," I said. I still had

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no clear idea how, but one was beginning to form in the back of my head. Shortly, I hoped, it would be at the front of my head. "But it will cost."

"Money—my God, Knave, what's money?" Mac said. "Let's order up some more drinks. We can celebrate now, as a starter—and again when the job is done—"

"No drinks," I said. "I've got some work to do."

His face went sober. Frankly, if the drinks had been good, I'd have chanced it; alcohol is a help now and then. But weak imitation Scotch and ice water? I ask you—isn't sobriety preferable? "Of course, Knave," he said. "Any help we can be—"

"One bit of help," I said. It was a basic rule; whatever I was going to do, it would stand. "Unless I recognize you, you don't know me. Maybe we met vaguely once, had a drink together. But you don't like me much. And you never mention my name outside this room."

Dedrick said: "Ha." Just like that. "What good will that do? If Ulg's people have beams trained on us—pickup beams trained on us right now—"

"Dear lady," I said, and watched her wince, "I'm a survivor: remember? I carry two things at all times, in any costume—a weapon, and a field distorter." I dragged out the weapon—my pet slug gun—and let them look at it. It created quite a stir. Dedrick wasn't fond of it, which figured. "If they have a beam on us now, they're picking up static, and they have been since I walked in. I suggest you shut up after I leave—instantly after I leave."

"Right," Mac said. He gave the others a look.

There were nods and murmurs.

Amateurs; but we might just make it. If I could think of the notion—the idea in the back of my head....

I looked even more confident than I'd been looking as I went round the room shaking hands. (Dedrick gave me a single shake, like a club signal or a cow-milking attempt. I bowed, held her hand and kissed it. Score one for sanity.)

And then I left.

Cudgeling, as the phrase is, my brains.

Somewhere, a perfectly obvious idea....

After a while I went out to find Marietta Jink, my sad rosebud.

We talked about orchestra schedules for a while.

I gave her a good deal of the story, leaning hard on Revere Tang: I thought that would have an effect.

It did: she turned paler than I was, after my days of toasting.

She asked some technical questions, and I said I'd get the information from Mac, or somebody. "MacDougal?" she said, awed. "Charles Hutson Bellemand MacDougal? Really? You know him?"

"Well, I've met him," I said. "And honey: he might be just as awed to find out that I know you."

"Don't be silly," she said. And she

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blushed. It's an interesting effect on that complexion. A sort of dusty light chocolate—cocoa mixed with powdered milk. (I never do. It's not a good idea.)

I gave her my very best grin. "For the Williamson," I said.

"For the human race," she said.

Well, she had me there.

She was still being starry-eyed about Mac when I left her, with nearly everything settled. Five thousand miles is a good hop for an orchestra, but she could get it managed; as a new conductor, with a lot of publicity, she swung weight even if the ship were sinking.

And that single hop was all we were going to need.

It was really ridiculously simple.

Let me tell you, Mac's picture of that inspection wasn't exaggerated. If anything, he underplayed it. I mean, you don't expect anybody to go over an orchestra with a fine-tooth comb.

But—leaving an area where U-235 was even remotely available—the Williamson got the full treatment.

Instruments checked—X-rayed for metals. Metal instruments, like the trumpets and such, Geigered and remote-analyzed.

Luggage, personal effects, scores, music stands...even the two spare sets of strings. "What are these?" a barrier inspector asked, with deep suspicion.

"Spare strings," the violinist in question said helpfully. "In case one breaks. We all carry a couple of sets with us. Perfectly ordinary," he added.

They were gone over. Mostly copper alloys, a little aluminum and steel. They were returned. "Hmf," said the inspector. "And what about the music stands?"

"Ordinary stands," Marietta said. "The same ones we've used all season and the season before."

"And the harp. Some of the strings are colored differently. Why is this?"

"Every C and F is colored," the harpist said. "It gives you your location points."

"And you have—"

"Spare strings," the harpist said. "Two sets. Here."

Copper, aluminum, steel.

The inspection took about nine hours. At the end of it Marietta was exhausted, the orchestra was exhausted, and the inspectors were still suspicious.

They had a final bright thought. "Your stick," they said to Marietta.

"Sticks. Three of them." She handed them over.

Ebonite, tipped with silver.

I got the whole report from Marietta, later; it wasn't thought wise, by me or anyone else, for me to show up down there. We could take the one risk that the inspectors weren't knowledgeable music-lovers—for some reason, such officials seldom are, and it is probably better so for all concerned—but dropping Gerald Knave into the mix seemed a little too much. So I stayed at the Apelles Hotel Dome, and enjoyed myself.

I did, too. Worried about Marietta

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a bit, but she was a capable sort, and the orchestra well-trained. I had a fine few days—I even found a man who owned some actual coffee beans, and mixed and ground them to order. Made some great coffee. Mac and the rest loved it.

And then the Williamson came on home for a final date—passing an inspection at the home end as well, but a little more easily—and all was well.

I wouldn't call the thing that sank Pram Island, destroyed Helliman Ulg and (unfortunately—damn it, we had no way of avoiding that) his work force, and wiped out the completed parts of the Thought Machine—despite tradition, I wouldn't call it a mushroom.

A toadstool, really. I don't like killing, and I don't like atomics...as it happens, I like total thought control a good deal less, and that tipped the scales.

But—yes, a toadstool. Killing innocent people—in a good cause, and no way out of it, but innocent people....

Not a good, luxurious mushroom. A toadstool.

Like Helliman Ulg—at whose door, I suppose, the deaths can really be laid. If you want to play that sort of game; I don't, and I'll take responsibility for the omelettes I make and the eggs I ruin in the process.

Mac feels the same way. So does Marietta; they've been seeing a lot of each other, I understand. Mutual comfort, no doubt.

No doubt.

Well—Apelles is full of lovely ladies. Dedrick and the helpful beanpole, Wilviria Spodin, didn't exhaust the list by any means. And I had all sorts of cash to toss around, which is always helpful.

I got enough for the U-235 to underwrite four years of the Williamson. And—after all, it's a living—an equal sum for myself. As they kept saying, money was no object.

To them—not to me.

And—you know?—it's almost a shame to explain the method. I might use it again some time, some other world, some other problem...orchestras are such helpful things.

You see, violin strings (and viola strings, and cello strings, and bass

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strings) are not made of metal. At all. Some harp strings are, and now and then a bass will turn up with its strings metal-wound—but that's about it unless you count steel guitars. Personally, I never count steel guitars.

They're made of gut, mostly, or imitations thereof.

But the spare strings were made of copper, steel, aluminum....

And got careful examination.

The strings actually on the instruments were metal too, of course. Looked just the same.

And passed simply as metal. I mean, if the spares were all right—it's an odd thing, but it's the way the human mind works.

You can, it seems, draw out three and a half pounds of uranium 235, 237, 238 or 239, to fairly fine wire. You can lead-coat it so it won't register on an average Geiger.

And you can use it for violin strings. Viola strings. Cello strings. Bass strings. Harp strings.

Damn it, if he'd needed more I might have taken a real chance and used the trumpets. Or at least the metal keys on the clarinets and bassoons and such.

But an orchestra full of metal strings was enough.

We made the trade from U-235 to usable strings right in the AHD, in my room, under a field distorter.

And building the bomb took very little time.

Four months?

We didn't need two.

Finest concert the Williamson string section ever gave, in a way—a millionth of a second, for a small audience, on a small and sovereign island. The island doesn't exist any more—but the memories do, good and bad. The toadstool sinfonia—the millionth-of-a-second symphony.

"Accidental explosion due to experimental work," and everyone was very sad. Controls on vital materials were tightened.

And after about four more days I couldn't take it any more. Mac and Marietta were distinctly a Thing. Scratch one rosebud, damn it.

Somehow, nobody else on Apelles looked quite the same to me. And it was just possible that a few businessmen might begin to develop a suspicion or two....

Oh, well: there are always other planets.

"Never let your business interfere with your living." One more old saying broken, or at least bent.

But my bank account felt much happier, thank you.

Shortly, I knew, so would I.

And—my Lord, they gave me a sendoff!

More bad Scotch than you would ever want to see. I drank it—hospitably, gracefully, gratefully.

I was especially fond of one detail: the looks Dedrick was giving Marietta Jink.

Falling, as it were, from grace. I hadn't really known she'd been after Mac....

But the thought made my journey offworld very pleasant indeed. ■

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You can't fool Mother Nature...

In my cynical view of the U.N. Moon Treaty, I made a quick reference to the fact that the 1966 Outer Space Treaty limiting military weapons of mass destruction in space was now obsolete because the persons who drafted it said the treaty had not considered the possibility of technological progress. They had not considered that the development of Particle Beam Weapons (PBW) and High Energy Lasers (HEL) could and probably would render the treaty meaningless in less than twenty years. From this data, I drew the conclusion that it is practically impossible to draw any sort of a treaty or agreement which limits the development of technology for the simple reason that no one, not even experienced futurists and technological forecasters, can possibly *predict* the future, even though they may try to forecast it. (Only a fool will try to predict the weather, but many meteorologists will forecast it, which means they make an educated guess about it which is sometimes correct.)

Almost anybody with a little brains and some notion of recent history can make a linear extrapolation of present conditions into the future...and this extrapolation will nearly always be *wrong* or miss the mark so widely that it will be laughable.

It's not that Mother Nature is capricious, but that the scheming minds of people have shown a stubborn refusal to follow the neat paths into the future that have been charted by futurologists, think-tankers, and even science fiction writers.

I was enraged by a TV ad for a margarine in which it was said, "It's not nice to fool Mother Nature!"

Damned right it's not nice!

It's *impossible!*

You can't fool Mother Nature. The best you can do is work with her. If you can't get from here to there in a technically straightforward way, you've got to be devious and find a way to get around the barriers in the way. And there are usually ways to get around them. If you don't find them, some other bright character will.

Mother Nature tells us that you can't fool her...and that the path to the future of technology is not the straight path it seems to be. It is as

THE ALTERNATE VIEW by G. HARRY STINE

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crooked as the Brownian Movement of a single particle in a colloid!

And it is driven by a perceived social desire sensed by a person who sees in the fulfillment of that social desire a way to improve the lot of himself and/or his family. In short, to get rich . . . or richer. Not at the expense of others, but in the process of fulfilling their desires for which they are happy and willing to part with vaulta. Con artists in technology don't last very long.

In fact, if you want to encourage the development of new technology, pass a law or adopt a treaty that prohibits the further development of some achieved technology. Prohibit a nation from developing and possessing long-range artillery; the nation develops the ballistic missile. Prohibit the deployment of weapons of mass destruction in space, and somebody develops weapons of even greater power that are capable of highly selective targeting. Prohibit war as you know it, and somebody will develop war as you never conceived it could be! Prohibit the construction of nuclear power plants, and somebody will come up with something else . . . maybe something that will seem to be more unpalatable. Prohibit recombinant DNA research by law, and who knows what direction the technology will take once it's forced underground or into other countries? Yes, it's something like damned if you do and damned if you don't . . . and better the devil we know than the devil we know not!

Technology—which means working *with* Mother Nature—may have its future course of progress altered, but never halted. Try to plan future unknown technology at your great risk, because it is a slippery thing that will quickly slide between your fingers and suddenly be off in a direction you never suspected!

The best series of examples of this were discussed and shown in great detail in the recent PBS series broadcast in late 1979, *Connections,* by James Burke. The book is just as good and should be required reading both for SF writers and for those who have the audacity to attempt to forecast the future (and I include myself in both categories). Some experts complained that Burke neglected Newton and a lot of other scientific achievements. Of course he did, because he was talking about technology, not science! And we are discussing technology here.

Personal incentive drives technology, even in the socialist world of the Soviet Union and the People's Republic of China where the personal incentive amounts to achieving a higher position in the "classless" society by being able to obtain permission for a better apartment, a dacha, a new or bigger car, and fewer bureaucrats to tell you what to do and when to do it. (Orwell: "All animals are created equal, but some are more equal than others.") In the Western World of government-regulated private enterprise (not "free enterprise," which

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we don't have but which might be worth trying sometime), a score-keeping token of value called "money" is injected into the system, and making more money allows you to purchase better living quarters, a new car, the vacation home in the mountains, and lawyers to fend off the bureaucrats. So just because personal incentive drives technology, don't shortchange the economic systems on the left because the personal incentive is still there, albeit in a different form.

I've had sixty more days in which to study the U.N. Moon Treaty now, and I'm not at all as worried about it as some people are. The treaty is so badly worded by people who really didn't understand the Third Industrial Revolution that I've figured lots of ways to dodge around some of the weasel-wording and imprecise language. Maybe we ought to pass that U.N. Moon Treaty. If history tells us anything, maybe we'll actually accelerate the development of space industrialization and colonization by doing so! It may get us out of the rocketry rut of astronautics. It may force us to think our way through the problems in a different manner, and that may reveal entirely new and unsuspected approaches to the big problems of space utilization today. The end result may well be that the U.N. Moon Treaty becomes the worthless piece of paper that we think it is... and faster than we think possible!

(Note: I'm trying to present some outrageous ideas and concepts here. If you want to write and tell me so, it's your stamp. But I already acknowledge the fact.)

We've been through some very rough times in this century (as our forefathers did in centuries past because the future is never "surprise free") and therefore we have developed a tendency to be slightly pessimistic about the future, probably because of our increased capability to communicate what is happening and our decreasing penchant for remembering what happened yesterday. History—which includes the history of technology, strangely enough—never proceeds in a predictable fashion except for its predictability to be unpredictable! There is, however, one constant that runs through it: the level of human achievement and general well-being has ever turned upward. It has turned upward because people in general *could* cope and *did* want things to be better for themselves and their children. There have been prophets of doom in every era; they strut their pathetic way across the world stage, disappear into the wings, and are forgotten as those with personal incentive work to achieve a better future... and succeed.

Too many people are afraid of the future.

I am not.

I am living in the future even as you read these words which were written in the past.

My past. Your present. Our future. ■

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The Reference Library

The Face, Jack Vance, DAW, $1.95, 224 pp.
Emphyrio, Jack Vance, DAW, $2.25, 208 pp.
The Pnume, Jack Vance, DAW, $1.75, 158 pp.
The Five Gold Bands, Jack Vance, DAW, $1.95, 160 pp.
Green Magic, Jack Vance, Underwood/Miller, $15.00 (signed & numbered, $25.00), 273 pp.
Schrödinger's Cat, Robert Anton Wilson, Pocket Books, $2.50, 256 pp.
The Faded Sun: Kutath, C.J. Cherryh, DAW, $2.25, 256 pp.
The Orphan, Robert Stallman, Pocket Books, no price given, 206 pp.
Visions of the Damned, Jacqueline Marten, Playboy Press, $2.25, 319 pp.
Fireflood and Other Stories, Vonda N. McIntyre, Houghton Mifflin, $10.95, 281 pp.
The Road to Science Fiction #3: From Heinlein to Here, James Gunn, New American Library (Mentor), $2.75, 656 pp.
The Science Fiction of Konstantin Tsiolkovsky, Adam Starchild, ed., University Press of the Pacific, distributed by ISBS, Inc. (P.O. Box 555, Forest Grove, OR 97116), $9.95, 455 pp.
The Life-Extension Revolution, Saul Kent, Morrow, $12.95, 468 pp.

by Tom Easton

Is this to be the year of Jack Vance? He's been writing science fiction for more than thirty years. He's achieved a solid presence in the field, having given us tales to remember such as *The Dragon Masters.* But he seems never to have received the kind of attention one might think he deserves.

That may be changing. Much of his work has been reissued in the last few years, and he has been producing new novels at a fair pace. The latest is **The Face**, brought to us by DAW as "The long-awaited fourth of the Demon Princes novels," with a fifth still to come. The premise is that hero Kirth Gersen lost family and friends as a child when his world was sacked by slavers commanded by a quintet of arch-evildoers. Gersen swore vengeance, and each novel tells how he defeats one villain. *The Face* deals with Lens Larque, an ugly, ingenious, cruel product of the equally ugly, ingenious, cruel world of Dar Sai, where settlements are protected from desert heat and drought by metal parasols over which flow sheets of water. As always, Vance displays great originality in names and incidents, but his characters seem oddly dreamlike, arbitrary, and both hero and villain lack luster. The hero's feats are the product of fortune rather than prowess, and the villain, for all his omniscience, dies in impotent triumph.

Much the same—ingenious names and incidents, dreamlike characters, gods jumping out of machines all over the place—can be said of the reissues.

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In **Emphyrio,** Vance studies a child growing up in an exaggerated welfare state, his people ground down by "Lords" who, millennia before, rebuilt his world after a devastating war. The boy identifies with a legend and, in time, after numerous misadventures, goes off to seek the truth behind the myth. The results, intended to be astonishing, smack of the fairy tale.

In **The Pnume,** fourth and last of a series set on Tschai, planet of adventure, hero Adam Reith finally manages to escape the world on which he was shipwrecked long years before. He has managed to build a ship with the aid of the locals, but his departure is delayed when he is kidnapped by the Pnume, the true natives of the planet. The Pnume live underground, where they support a civilization with the aid of human slaves and observe the long sequence of alien invaders of the surface. They are historians, of sorts, and they keep a museum called Foreverness, stocked with preserved samples of the various aliens. Now they want Reith for Foreverness, and he must escape, at the same time freeing the slaves of the Pnume.

In **The Five Gold Bands,** Vance posits a future in which interstellar travel is controlled by five men, descendants of the man who invented the stardrive and kept it a family secret. Regularly, they meet to allocate drives to the worlds. Proud, haughty, and of different native tongues, they employ a condemned criminal, Paddy Blackthorn (the stereotypic Irish bog-walker), as interpreter. But Paddy turns the tables, kills the Sons, and escapes with five golden bracelets, one from each Son and each containing the location of a part of the recipe for the stardrive. The novel is the tale of how Paddy and a Terran intelligence agent gather the recipe. Obstacles fall like rows of dominoes, the agent obligingly falls in love with Our Hero, and together they liberate civilization from the stranglehold of monopoly.

Green Magic is a well-produced collection of Vance's shorter works. It includes "The Moon Moth," a puzzle piece in which Vance suggests how a murderer may be identified in a society where everyone wears masks; "Green Magic," in which he comments on levels of wizardry beyond white and black; "The Pilgrims," a typically annoying (to me) tale of Cugel the Clever; and "Liane the Wayfarer," in which the hero accepts a quest with surprising results. This last is the oldest tale in the book, dating to 1950, but I find it more satisfying than much of Vance's later work. The dreaminess is there, but the plot seems less arbitrary and more probable, given that the story *is* a fantasy.

All writers stack the deck, but Vance does so more than most. I said above that he is fond of divine jumping jacks. Such devices are common enough, if one includes the free use of favorable coincidence, and they are not really forbidden to any storyteller who aspires to excellence. They are, however, generally best used when inconspicuous and not too plentiful. Vance uses them freely, and he seems not to worry about concealing them. This irritates me, even though I recognize that it is a hallmark of his style and presumably one root of his popularity.

Vance irritates me in another way too, though, and this irritation is more

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serious, for it can turn me off a story that is otherwise excellent. I sense in him a smugness, a feeling that our descendants are bound to despoil their technological, intellectual, and spiritual heritages. The smugness is perhaps parallel to the feelings one might attribute to this country's early settlers on seeing what *their* descendants have done to the physical environment they knew, or to their morality and religion. I am similarly irritated by other writers, such as E.C. Tubb, with his Dumarest of Terra series, who also project a future in which vice, stupidity, and venality seem to dominate the cosmos, where society is fragmented into feudal, autocratic, slave-holding, etc., worlds, each one a paradigm of a different human evil or weakness and not one embodying the dreams of the present as a success.

This smugness may be justified, for by and large folks are a pack of damned fools who can always be trusted to abandon their hope of utopia for some present indulgence, to drop preachers for demagogues. A bird in the hand, after all, is worth two in the bush, and pie on the plate right now beats pie in the sky by-and-by. But I find it difficult to believe that once (if) we reach the stars and spread human civilization across a multitude of worlds, *no* world will represent some utopian apotheosis, or even a muddling-through continuation of present-day America, Western Europe, Japan, or China.

But I am railing on against something I don't like as though it were some universal offense against reason. And it's hardly universal. There are optimists out there, and if they seem rare at times perhaps it is only because pessimism offers more opportunities for active, exciting stories and vice more chances for allegory. Like some editors, I am reluctant to accept that pessimism is more popular with readers (or, really, with writers and publishers), especially when there exist writers like Marion Zimmer Bradley, Orson Scott Card, Joan Vinge, and A. Bertram Chandler, all pleasures to read and all—at times, at least—optimists.

Robert Anton Wilson is either absolutely stark raving mad, or he is one of the more perceptive members of our species. Those of you who have read the *Illuminatus* trilogy, by Robert Shea and Wilson, know as much, and you should expect **Schrödinger's Cat** to tell you the same. The cat, a paradox of quantum mechanics that is both alive and dead, signals Wilson's plot, such as it is, a set of jaunts through parallel Earths, none of which is our own. The central thread—is there one?—seems to be a concern for human survival, for our necessary, destined explosion to space, but only as it is mired in more mundane concerns such as terrorism (P.O.E. wants Mickey Mouse on the dollar bill and will blow up the world to get its wish) and politics (would you believe a Know-Nothing president who preaches a Revolution of Lowered Expectations, is against science, and who is named Furbish Lousewart?). This thread emerges from a sweltering mass of satiric overkill and kaleidoscopic antics of a type all too familiar to *Illuminatus* readers. The style takes getting used to, but it may be worthwhile to make the effort. Wilson can be oddly compelling, for despite the seeming chaos of his story, he writes

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clearly and vividly, and he successfully prods the reader's thoughts.

When *Illuminatus* was published, some reviewers went ape. They thought that it and its stage version were the cat's pajamas, the cream of the scream, the peak of the climax. I rather expect *Cat* to be welcomed by similar noises, and I therefore wish to take this opportunity to warn you. I suspect Wilson is an acquired taste, a taste that had ample room to develop in three volumes of *Illuminatus* and that may already exist in boob-tube addicts. If you have it already, you will probably enjoy *Cat;* buy the book and my best wishes to you. If you don't, leaf through the book or borrow a friend's copy long enough to gauge the book for yourself. You don't want to spend money on something which, it later turns out, revolts you.

One of the better writers to come on the scene during the 1970's has been C.J. Cherryh. She is gifted beyond the ordinary with a talented imagination, a facility with words, and an inordinate appetite for work. She began her publishing history with *Gate of Ivrel,* an interesting, if less than exceptional, mix of sword-and sorcery and SF. It was not, however, many years before she brought out the first of her *Faded Sun* books. The trilogy is now complete with **The Faded Sun: Kutath,** and I am all too happy to recommend the entire series.

Cherryh has envisioned a far-future cosmos in which humanity's sphere of expansion has encountered that of the regul, mercantile aliens who employ the mri as mercenaries. War ensues, and the trilogy opens at war's end, when a human expedition arrives to take over the mri base-world Kesrith as the spoils of peace. The regul turn on their warriors, a human befriends the two survivors, assumes their ways, and aids their effort to return to the home-world departed eons before. In *Kutath,* the trio has reached this home with human and regul ships hot on their heels. The human renegade, Sten Duncan, takes on the task of trying to make peace, a task all the harder for the mri reputation for ferocity in war, human hatred and fear of them, and regul anxiety about letting the mri survive to become allies of the humans. The outcome of Duncan's efforts defines the novel and the trilogy as a whole in a very humanly satisfying manner.

However, there are drawbacks. The mri are portrayed as nearly human in form, but of customs so alien as to make it almost impossible for Duncan to ape his friends. Yet he succeeds, and Cherryh does not succeed in convincing me that the mri are more than aberrant humans—an offshoot, perhaps, of Frank Herbert's Dune-dwellers. The regul, on the other hand, are physically alien, foreign in physiology and form to all human norms, and they seem, at least superficially, more akin to humans in mind. The differences revolve around a preoccupation with personal and clan honor, with profit and loss, with status and survival (is that so unhuman?). A major difference is Cherryh's claim that the regul have no imagination; they cannot "remember the future," as one regul puts it. Yet they can plan and project the future consequences of present actions, and what is that but a form of imagination? Cherryh has not shown us an intelligent species without imagination, and though the con-

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cept is intriguing, I doubt that such a thing can exist. After all, as we understand it, intelligence is the ability to solve problems, largely by thinking through possible solutions and picking one to try in action, by imagination. A species without imagination would fail to see choices among paths into the future; it would be forced to act by reflex or instinct alone, and it would not be recognizable as intelligent to our minds. I suspect that Cherryh would have been better advised to stick to the reguls' eidetic memory and lack of ability to conceive the idea of lies in characterizing this species. This seems both more pertinent to the story and more reasonable as a possible reality.

These drawbacks are minor, of course. Very few SF writers can escape anthropocentrism in conceiving their aliens, and the same is necessarily true of readers. Aliens have to be expressed, by us and for us, in humanly understandable terms, and if Cherryh's claims of otherness interfere with this necessity, they do not interfere with the story to any great extent. Situations are vivid, characters come as much to life as they can on paper, and the action makes sense, from its beginning to its resolution. All three books of the trilogy have a place in any SF readers library.

I don't intend to argue the place of fantasy in Analog now, for though I have a couple of fantasies to tell you about, I do so because they are worth reviewing wherever they may be brought to the attention of readers. The first is Robert Stallman's **The Orphan,** a compelling version of the werewolf story. It opens with a shaggy beast trapped in a farmer's hayloft. To escape, the beast tells himself, "Now I shall use what I have been taught," and turns into a small boy. The farmer and his wife adopt him, he lives as a boy with nighttime excursions as the beast, and when thugs invade the house he defeats them as beast. He then escapes, travels, in time becomes a different, older boy, and again lives a double life.

The story is set in the years of the Great Depression. This permits a flavor of nostalgia all the keener for coming through the werewolf's viewpoint. The people are common, not city slickers, good, wholesome, earthy, and the werewolf is not so bad as one might expect. For one thing, he is not a were*wolf,* but something undefined for all his fur and teeth and claws, something with an undefined past (his background, alluded to in the beginning, is never explained), and the people he becomes involved with share a curious link, perhaps because of the curious statuette he encounters along the way. He is young, too, and growing at uneven paces in his dual incarnations. He is full of conflicts and yearnings, largely due to the split between his selves and lives, and he is one of the better realized aliens in my experience. The mysteries of his origin and life the author leaves us are tantalizing rather than frustrating. I hope that Stallman will produce a sequel, a prequel, or a paraquel (?), anything to give the alien a context of its own, but I do not need that to recommend *The Orphan* to you. It offers warm and human enjoyment, a rare experience of reading pleasure.

That last sentence also applies to Jacqueline Marten's **Visions of the Damned.** The book is something of a

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surprise, for it comes from Playboy Press, which has lately been sending me some real dogs to review (I include P.J. Farmer's *A Feast Unknown*—Tarzan meets Doc Savage—and *Image of the Beast*—Forrie Ackerman meets The Thing—as dogs, however cute and sexy). *Visions,* however, is something else. Don't let the puff put you off. The book *is* a Bridie Murphy, past lives recalled through hypnosis, 900-year-old curse on the family's men, cliché of a story. *But* it has an irrepressible gamine of a heroine, a smooth super-competent family-friend hero, and loves that aspire to—and achieve—tragedy. Marten has a human touch that transmutes cliché to reality, even to art, and I would not have you miss it.

Vonda McIntyre wrote "Of Mist and Grass, and Sand" and then expanded that story into *Dreamsnake.* She has shown us that she is an artist of feeling—of emotion and sensation—rather than action, and such an artist as we see all too seldom. She deserves her prizes, of that I am sure. I am less sure that she deserves them for her prizewinning stories, for she has written other tales that strike me as richer in meaning, texture, and skill. One is "The Genius Freaks," whose premise is a world where genetic engineering has been used to design and produce human variants of high intelligence and physical peculiarities; the variants once waged war on the normals and lost; thereafter they were gene-tailored to die young. The story is told from the viewpoint of one such variant who is dying even younger than she is supposed to. Through her character's thoughts McIntyre skillfully portrays her world, its views of the variants, and an agonizing interplay of scorn, pride, and concern.

"Freaks" can be found, together with "Mist," "Aztecs," and more between the covers of **Fireflood and Other Stories.** The title does not reflect McIntyre's apparent preoccupation with flight—wings, natural and given, starships, and soaring spirits—but that should put no one off. The book, however titled, is a showcase of literary jewels whose like cannot be seen outside of Cartier's or Tiffany's. I may be guilty of hyperbole here, but the fact remains that *Fireflood* is not a book to miss.

James Gunn has been assembling the definitive SF anthology, *The Road to Science Fiction. Volume* 1, *From Gilgamesh to Wells,* covered the precursors. *Volume* 2, *From Wells to Heinlein,* covered the history. Now we have **The Road to Science Fiction, Volume 3, From Heinlein to Here,** and it may be the best of all possible SF collections to start a youngster, or an adult friend, off on. It contains 36 stories, one each by 36 luminaries of the past four decades: Heinlein,

There is just one thing I can promise you about the out space programme: your tax money will go farther.

WERNHER VON BRAUN

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Asimov, Simak, Kuttner & Moore, Bradbury, Sturgeon, Leiber, Clarke, Bester, Lafferty, Pohl, Ellison, Brunner, Zelazny, and more (but no Budrys, no McIntyre, no....Limits of space?). There are gems here, from the Kuttner/Moore "Mimsy Were the Borogroves" to Bester's "Fondly Fahrenheit," tales I remember fondly and reread with delight. My only objection is Gunn's excessive cuteness with his discussion titles, such as "The Ballad of Lost C. Smith" (for Cordwainer S.), "The Simak Reservation," "Farmerworld," and "Aye, and Delaney." But don't let that stop you. Buy it for the memories. Buy it as propaganda. But *don't* ignore it, please.

A book that deserves at least brief mention in this column is **The Science Fiction of Konstantin Tsiolkovsky.** Tsiolkovsky was a provincial Russian schoolmaster who dreamed of space travel. His primitive experiments predated Goddard's in this country and the wings of his imagination were more magnificently pinioned than any since Leonardo. He was at least two generations ahead of his time, for in the writings collected here are foreshadowings of the orbital elevators of Clarke's and Sheffield's novels, of the Ringworld of Niven and the Macrolife of Zebrowski, of multistage rockets and asteroid and moon mining. There are even sections that read like primitive drafts of O'Neill's *High Frontier.*

Calling Tsiolkovsky's work science fiction is less than just, for though his pieces may resemble 1920s *Amazing* SF—a lecture dressed in a tutu of a plot—they are primarily essays, and in a style reminiscent of Asimov at that. Their main interest to us now must be historical, for much of the science is outdated, but that interest is considerable. I recommend the book to anyone concerned with the history of SF or of space technology.

Saul Kent's **The Life-Extension Revolution** is a bad job of overblown titling. Subtitled "The definitive guide to better health, longer life, and physical immortality," it might better have been called "The long-life catalog of scientific clippings." Kent, an activist in the life-extension movement since the early sixties, seems to have gone trotting through the biomedical literature with an open notebook. Once he had a filing cabinet full of notes, he arranged them into chapters, typed them up, and found a publisher.

My cracks should not be taken to mean Kent did not produce an interesting and even valuable book. He did. He has laid out for the lay reader a vast amount of data on diet, stress, anti-aging and rejuvenation therapies (serious and quack), immunology, organ replacement, and even cloning, all with an eye on possible relevance to problems of aging. He tells you who to see for more information. And he has done a two-armed job too, rarely (to my knowledge) hesitating to provide the "on the other hand" for disputed or controversial findings. The slant is optimistic, and the inevitable propaganda is inoffensively low-key, showing most, perhaps, in Kent's coverage of cryonics. The chief faults are a tendency to excessive oversimplification and the book's "notebook" guise. I, for one, would appreciate a more analytical, discursive treatment of the same material. If you don't agree, happy reading and long life! ■

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Brass Tacks

Dear Mr. Schmidt:

I wish to take violent exception to Jerry Pournelle's contention that civilization will collapse in the mid-eighties and that society will disintegrate. I have just finished reading Barbara Tuchman's book, *A Distant Mirror: The Calamitous Fourteenth Century,* when everything that could go wrong did. Society did not collapse. Where the Black Death left too few to maintain a village, the survivors removed to another village that had suffered less. The towns were thriving; trade was bad, but business was good. Most of the urban poor had been wiped out by the plague, and there was more work to be done than hands to do it.

Consider our own country. In the year of the old eighteen-hundred and-starve-to-death," "the year without a summer," the people did not attack one another for food. Instead, the corn merchants of New York scoured the southlands for food and brought in enough for all. Society didn't dissolve; it regrouped and surged forward. There was no revolution. People coped and cooperated.

In the recent bad winters people opened their hearts and homes to stranded travelers. This winter, when Southern California almost washed away, those whose houses still stood took in those whose houses had washed away. They cooperated. In times of crisis people do not fall apart. Suicides go down and everyone pitches in to do what is necessary.

Monetary collapse? They have happened in many times and places, and people coped. Revolution? By whom; and for what? The "revolutionaries" of the sixties are the politicians of the eighties. In many countries revolutions are a way of life. People cope.

JEAN M. ANSTEY
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Dear Mr. Schmidt,

I would like to comment on William Bainbridge's "Analytical Laboratory, 1938-1976" printed in the January issue, and question the validity of conclusions if they are based solely on the responses to AnLab. What kind of cross section of readers do the responses represent?

The reason this sparked my interest enough to write is that his conclusions differ from those of my science fiction fan club (with a membership of one) about what the readers are interested in. And his conclusions seem to influence your editorial policy, that novels are more popular than short stories. I am certain that there are a lot of readers, like myself, who have never reacted to the Lab. We are constrained by time. I buy few books, because I don't have the time to read them. If I try, I end up staying up all night reading an exciting story, then regret it the next morning when I try to work. I read science fiction magazines because they have short stories. Stories I can read at lunch, or in the car while waiting for my wife, or just before dropping off to sleep.

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I also want to comment on another trend in science fiction I would like to see modified. A lot of science fiction these days is very pessimistic and regressive. Many stories locate on planets where primitive cultures do battle with swords, or where cavemen meet expanding Earth-based civilizations. Stories where the bureaucracy has gone amok into the culture predicted by George Orwell in *1984*. What I would like to see is more optimism, based on invention, exploration, and initiative. What happened to Robert Heinlein? What about a farm on the moon, or a businessman who talks his comrades into investing in a martian colony? Maybe I'm hopelessly out of date, but I wish there were more dreamers among your authors who had positive hopes for tomorrow, not dread of the future.

KEVIN F. OWENS
3938 Providence Place
Fairfax, VA 22030

Alas, really high-quality surveys cost far more to do than our budget permits. We do plan to run a readership survey of our own rather soon, and we welcome suggestions of questions to be included on it. Meanwhile, any reader who feels strongly about something and wants his opinion taken into account will just have *to find time to write—as you have done.*

As for hopes versus dread of the future—I'm wide open for it. Authors please take note. Not blind *optimism, mind you—but I've long maintained that if we fail to find solutions to our problems, it won't be because none exist. It's harder to write about futures that might work than to moan about the ones that won't—but that's what I'd like to see more of.*

Dear Mr. Schmidt:

G. Harry Stine's question—what principles should guide us in our treatment of extraterrestrials—is interesting and thought-provoking. But the system of principles he calls "metalaw" provokes mainly confusion.

First of all, the principles, far from being the revolutionary breakthrough which Stine claims, are really just some of the old classics of ethics. The only really original idea of any significance in metalaw is the "First Principle" of the system, the idea that we should do to others *not* as we would have them do unto us but as *they* would have us do unto them. An examination of this principle shows that we would be a lot better off with the old classics. Any serious thinker can figure out that the Golden Rule means that we should do unto others as we would like to be done unto *if* we were in their circumstances. And, until the extraterrestrials can tell us different, we would have to assume that, in the same circumstances, they would want to be treated as we would: for instance, not to be blasted with laser cannon.

The real trouble with this Haley's Law is that, as a "First Principle," it is supposed to define right and wrong in conduct. Right, then *means* "doing as the other wishes" and wrong means denying the other's wishes. Accordingly, whatever anyone wishes *must* be right and that is what I must do. The conflict in lifestyle between us and some extraterrestrials might mean that their wishes would involve harm to us or our planet. It is one thing to say that we should respect the wishes of others but that does not mean we

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should make their wishes the sole, absolute guide to our conduct.

Stine, of course, realizes that his "First Principle" is really not a proper first principle of conduct, so he adds a number of exceptions, again, nothing novel: destruction of intelligent life is bad, freedom of choice is good, etc. But Stine manages to combine these into a system absolutely incapable of guiding behavior. It may be that there are times when an intelligent being *ought* to be destroyed; but Stine's rules do not cover such situations.

According to the rules of metalaw, freedom of choice seems to be "higher" than any other principle; any act, even the destruction of intelligent beings, seems to be allowed in defence of freedom. What Stine does not seem to realize is that virtually every act restricts the freedom of someone else. A moral principle based on freedom doesn't have to say that freedom is valuable and should not tell us that it can be defended absolutely; what is needed are principles to tell us when freedom must be restricted since, inevitably, it is restricted.

Stine is apparently unaware that, in reality, interests of different individuals, not to mention different species, almost invariably conflict with one another. In any sustained, serious contact with alien beings two types of difficulties are likely to arise. First: those wishes on one side which are considered wrong by the other side: second, conflicts in which neither side need be considered wrong but in which the desires of the two sides are mutually exclusive or incompatible. What would be needed in such situations would be principles which guide compromise, and Stine's metalaw is totally inadequate.

The reader can easily demonstrate this independently. Just take the simple and well-known case of the smoker and the non-smoker on the bus. The smoker wishes to smoke a cigar and the non-smoker wishes there to be no smoking. Now just try to solve the conflict using Stine's inconsistent system. And if it is no good at dealing with such commonplace difficulties among ourselves, just how could it be useful when the aliens start to land?

LOIS A TILTON

227 Regent St.
Glen Ellyn, IL 60137

No one ever said this field was simple!

Dear Mr. Schmidt:

In 1924, the Russian scientist, Fridrikh Tsander, conceived of the "advanced" space propulsion technique we now know as solar sailing. Tsander may have been influenced by Konstantin Tsiolkovsky, who had proposed the photon rocket in 1921. To place these developments in perspective, recall that Robert Goddard's first successful liquid propellant rocket was not flown until 1926. Tsander realized that the slight photon momentum from sunlight could be harnessed using large, thin reflective sheets to propel a suitably-equipped spacecraft without any propellants.

With the high cost of Earth-to-orbit transportation for the forseeable future, Tsander's concept takes on special appeal today. While a solar sail cannot be used to propel a payload from a surface to orbit, it can be used in the inner solar system to replace a much larger mass of propellant to move payloads between different planetary orbits. Of greater impor-

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tance is the sail's reusability; a single sail may last 20-30 years at 1AU from the sun. Every kilogram of propellant saved through the use of a solar sail is one kilogram less that needs to be moved through the Earth-to-orbit logistics link, at a savings of approximately $1,500 per kilogram at projected Space Shuttle charge rates during this decade. When compared with chemical propulsion options, savings can amount to several hundred thousand kilograms for a single mission; in fact the solar sail makes missions possible which would otherwise not be economically feasible. Savings over competing electric propulsion, or "ion-drive" schemes are not so dramatic, but for many missions of durations exceeding about two hundred days, the sail wins out. Each reuse of the sail is then a further gain.

If solar sailing is so good, where is it today? The answer is that solar sailing is alive and well, with a deployment dynamics experiment (DDE) and an engineering development mission (EDM) planned prior to 1985. Both are part of the World Space Foundation's Solar Sail Project, with much of the work being conducted at the University of Utah, where the DDE got started under the direction of Dr. Gary Flandro (discoverer of the Grand Tour trajectories, one of which is now being followed by Voyager 2).

After solar sailing lost out to the further-developed ion-drive technology for the proposed Halley's Comet Rendezvous mission, the whole mission was dropped because of short funds, and the sail seemed forgotten. Dr. Flandro's work kept the sail alive with help from the Utah Section of the American Institute of Aeronautics and Astronautics and some aerospace companies.

The DDE is planned as a detailed investigation of sail behavior during the critical deployment process. One thousand square meters of thin folded aluminized plastic film must smoothly emerge from a volume of a few liters. The EDM is to depart from high Earth orbit, using solar pressure to enlarge the orbit to eventual escape from Earth, perhaps using a lunar swingby maneuver. Design and operational experience gained are to be applied to a follow-on sail with perhaps ten times the area which could be launched as early as 1987 to carry a scientific payload to rendezvous with one or more Earth-approaching asteroids. These bodies are of considerable scientific interest, and are likely to become the first to yield extraterrestrial resources sometime in the future.

Funding for the project is being sought from traditional grant sources, in-kind contributions, and from individuals, who may become Project "subscribers," receiving in return periodic status bulletins, photographs, and a piece of the same material as used on the first Foundation sail. More information may be obtained by writing to: Solar Sail Project, D-101, World Space Foundation, P.O. Box Y, South Pasadena, CA 91030.

ROBERT L. STAEHLE
President
World Space Foundation
P.O. Box Y
South Pasadena, CA 91030

Dear Dr. Schmidt:

While reading the article on living systems by Robert Freitas (March 1980) a thought came to my mind: that com-

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puters already have many of the 19 critical subsystems listed by Dr. Miller (shall we call them the Miller subsystems?). The case or cabinet serves as supporter and part of the boundary; to the latter we can add the console panel. The power supply acts as an ingestor and convertor and to a very limited extent a producer and matter-energy storage. (Batteries assume these latter functions in some computers, i.e. handheld programmable calculators). Heat radiating surfaces act as extruders, and the motor function is taken by...well, motors—in tape drives, printers, etc. A computer can, of course, also have motors for physical motion of the entire unit; then it's a robot.

I/O devices certainly meet the specs of input and output transducers. The internal transducer would be the priority interrupt system, channel and net is the various data busses, decoders and encoders exist in hardware (ASCII encoders/decoders) and software (compilers, disassemblers). Memory is core or semiconductor storage and the decider is the central processing unit.

All that's 'missing' are the reproducer and the associator. It's not too hard to imagine how to give a computer (better, a robot) the means to reproduce itself. Computers generally don't associate information, however, in an 'enduring' way.

To the extent, then, that the Miller subsystems *define* what is meant by a living system, a computer is then very close to being one! Computers also seem to conform to some, but not all, of the hypotheses listed in Freitas's article. The failure to conform precisely suggests to me that these hypotheses are not inevitable consequences of the presence of the Miller subsystems, but rather say something about the way the Miller subsystems tend to work together in biological life. (Does this then suggest that to the extent the hypotheses fail for computers, we are building our computers wrong?)

Computer and biological systems part company in at least one other way as well: the cell-organ-(etc.)-supranational system hierarchy has no electronic counterpart. Networks of computers do exist, giving us one other level of system, but I don't see that higher levels exist, or that the various components of a computer have many of the Miller subsystems. In this sense, a computer is more like a *cell* than an organism!

Maybe that's why computers aren't too bright...

RICHARD S. HOLMES
Dorm 4, Room 46
FermiLab
Batavia, IL.

Well, maybe...but there remains the embarrassing fact that the garbage we put into the Input Transducer often has a lot to do with the garbage that comes out of the Output Transducer!

Dear Stan:

I suppose critics ought to respond to Jack Williamson's "Case Against the Critics" (April 1980). Me, I am only half a critic, and (for Williamson's piece) the wrong half, a technical critic. Most technique is, however vaguely, objectively measurable—it is possible to say "This is badly done," because there is some agreement on what is supposed to be done, and how one is supposed to do it. It's not possible to claim, to take an instance out of "TVSF," that Rock Hudson is a good actor without meaning something radically

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different by the word "actor." It is possible to claim that he is enormously successful with movie audiences, and that's the claim that interests the half of me that isn't a critic.

I once tried to explain to an editor that I didn't review movies, I reviewed audiences. Meaning: I'm fascinated by the fact that something does or doesn't work, with no apparent relation to its technical merits; I try to find out what it is that's working, and what the fact that it works might mean; in fact, whether or not I'm writing about SF movies (and I've done years of work for non-SF publications), I'm an SF critic: what I want to know is 'where are we going?,' and, just as in fiction, speculate a little, from a known base. The difference is that, in fiction, you lay out the results; in the sort of movie reviewing I do, you lay out the speculation, and as much of the basis for it as you can crowd in. But this puts me miles from the danger Williamson is worried about.

I'm never abstracting a single meaning out of a work. What I'm trying to do is figure out what the work is going to do to us—and (because of what it already has done, or hasn't done) who we are, and who we might become.

This is a hell of a large order for a man looking at a movie or a TV screen, but it may make more sense than it seems to. Dr. Johnson noticed that nobody is a hypocrite in his pleasures, and entertainment (where it isn't all cluttered up with Must See and Sixteen Awards) may be the last non-hypocritical place left—the last place to try seeing people being themselves. There is the hell of a movie, and, I think, a better TV job, to be made out of *The Humanoids,* though I doubt anybody'll do it anywhere near right; were I reviewing somebody's shot at it, I'd start with purely technical questions, and go on into a kind of criticism, maybe more common than even critics think, that doesn't narrow down the work or try to sell you the bare bones because it's interested in what the work says about those who experience it, and what it predicts about future works.

Critics come in lots of different sizes. This is a size I don't see mentioned much.

LAURENCE M. JANIFER

Dear Sir:

Funny how fast some statements date. In the Alternate View, March, 1980, G. Harry Stine states that the 'Beat the Russians' game can no longer be played. Evidently he wrote the column before a) the Iran/Afghanistan affair and b) the end of detente.

There is much talk of a return to the Cold War. Whether this is good or bad is not certain. But perhaps it will mean an increase in government interest in space. Defense may revive its interest in the Shuttle. We may get that laser ABM system that, according to Jerry Pournelle's columns in other magazines, would set off a new phase in space exploration. And so on.

No doubt a renewed interest in space by the government would delay private enterprise's interest. It has so far.

So, instead of the ball being in private enterprise's court, it is back in the government's. This puts Jerry Pournelle's view of the situation ahead of Stine's.

ROBERT NOWALL
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Cape Coral, FL 33904

This month, anyway.

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